COMMONWEALTH BUREAU OF CENSUS AND STATISTICS
MELBOURNE, AUSTRALIA.

LABOUR AND INDUSTRIAL BRANCH
REPORT No. 1.

# Prices, Price Indexes & Cost of Living IN AUSTRALIA

BY

G. H. KNIBBS, C.M.G., F.S.S., F.R.A.S., etc.
Commonwealth Statistician.

Published under the Authority of the
Minister for Home Affairs.
December, 1912.

By Authority: McCARRON, BIRD & CO., Printers, 479 Collins Street, Melbourne.

# PREFACE.

As this is the first Report issued by the recently organised Labour and Industrial Branch of this Bureau, a few words concerning the scope and functions of this Branch may be of general interest.

The Scheme of work provides for systematic investigations into the following matters:—

*A.—Trade Unionism.*—Classification of unions and members by industries; development of unions and members; the law relating to trade unions; economic characteristics of trade-unionism; trades and labour councils and federation of unions.

*B.—Wages and Hours of Labour.*—The course of wages; index-numbers shewing relation between wages, prices, &c.; current wages and hours of labour—metropolitan and country—in each State.

*C.—Changes in Rates of Wages and Hours of Labour.*—The amount of the change; the number of workers affected; individual and aggregate effects of changes on amount of wages paid; method by which changes brought about.

*D.—Strikes and Lock-outs.*—Classified according to industries affected; their cause, duration, method of settlement, number affected, and direct and indirect losses; operations under Federal and State Arbitration and Conciliation and Wages Board Acts.

*E.—The Unemployed.*—Classified according to industries; seasonal and general fluctuations; index-numbers of employment; average duration of employment; operations of Government Labour Bureaux; effect of non-conformity of employment on earnings; co-operation in international investigations.

*F.—Prices, Fluctuations in Exchange Value of Gold, and Cost of Living.*—Import and export values, wholesale and retail prices, and house rents; special investigations for past years; index-numbers; cost of living inquiries by household budgets; internatonal comparisons.

*G.—Investigations in regard to Principal Industries in Commonwealth.*—Numbers employed and wages paid; classification of wage-earners according to occupations and wage-groups; comparisons between rates of wages and actual earnings.

*H.—Miscellaneous.*—Reports on state of labour market in various industries and localities; immigration; operations of Labour Bureaux; legal cases affecting labour; industrial accidents; co-operation and co-partnership; review of laws affecting labour in Australia and elsewhere; review and analysis of reports issued by Australian, British, American, and Continental European Labour Departments.

*I.—Special Subjects of Investigation.*—Concurrently with the general inquiries to be conducted by the Branch (as specified above), it is proposed that investigations shall be carried out into special matters. Each of these would extend, if necessary, over a period as long as one or two years, and would deal with such matter as:—Apprenticeship; the working of various laws specially affecting labour; the employment of women and children; industrial education; noxious and dangerous trades; workmen's compensation and social insurance; fluctuations in employment and their effect on the conditions and efficiency of labour; the housing of the working people; the cost of production; the regulation and restriction of output.

It may be seen, therefore, that the new Branch deals with matters of great importance and interest to practically every section of the community.

The main object of this report is to furnish information as to prices in past years in such a form as to be fully comparable with that which it is proposed to publish periodically in the future. A further report, with a similar object, will be issued in the course of a few months, furnishing information for past years (and for the current year) as to Trade Unionism, Employment and Unemployment, Rates of Wages and Hours of Labour, and other matters of a cognate nature.

It is proper here to observe that the variation in the cost of commodities has passed from the region of merely academic questions in Australia, and is influencing the decisions of Industrial Tribunals and Wages Boards, and it became, therefore, necessary to examine the whole question exhaustively. The result of this was to clearly demonstrate that if the results are to be accurate and valid, a much more rigorous technique than is usual must perforce be followed. This is illustrated in the methods here followed, and the question has been elucidated in the appendices.

Recently the attention of statists and economists has been pointedly directed to the importance of the question of price-indexes, and the feeling has arisen that international practice should be uniform. Upon examining the whole question it was seen that ***the procedure ordinarily followed in computing a price-index was so seriously defective as to be misleading***, and that no sort of general agreement existed in detailed results. With a view, therefore, to deciding upon an accurate technique for this inquiry, and of assisting in deciding upon an international technique, Appendixes VIII. and IX. have been added. In these Appendixes a rigorous method is deduced, and it is shewn that its practical application is very simple.

G. H. KNIBBS,

Commonwealth Statistician.

Melbourne, 5th December, 1912.

# SYNOPSIS.

## GRAPHS.



## Appendixes.

# PRICES, PRICE INDEXES AND COST OF LIVING IN AUSTRALIA.

## I.—INTRODUCTION.

1. **General.**— Probably no subject has recently attracted a greater amount of public attention than the extent of variations in prices and the exchange-value of gold, a matter which, in its relation to the cost of living, is fraught with importance to every section of the community. It is stated in many quarters that during the last few years there has been a world-wide rise in the cost of living, and that this fact is borne out by the deep-seated unrest which has expressed itself in many ways in various countries—in bread and meat riots, in resentment against taxation, in strikes and syndicalism, in socialistic agitation, and in blame of all sorts of persons and conditions. Numerous investigations on the subject, both official and unofficial, have been made during the past few years, and it has recently been proposed that an International Commission on the Cost of Living" should be appointed to make a comprehensive study on an international basis, using as its foundation the results of various national investigations already made, or now in progress.

While this Report is not directly concerned with either the alleged causes of price-movements, or the various suggestions as to proposals to obviate these, it will be well to draw attention to the difficulty and complexity of the questions at issue, and to the danger of concentrating attention merely on such facts as may chance at the moment to be specially prominent, and may perhaps be alleged to constitute the sole causes.

The majority of the reports on the subject that have been issued in various parts of the world allege that the increased production of gold has been an effective factor in raising prices, while others believe it to be due to a wide-spread advance of credit, greater velocity of the circulation of currency, and consequently a diminished need for gold, and also generally increased banking facilities. Many investigators believe that the true explanation lies in the effect of legislation affecting tariffs. Others allege that the increased cost of living is merely a change in the standard of living, that it reflects luxury, or even extravagance—in other words, the prevailing condition is more appropriately referred to, not as the "high cost of living," but the "cost of high living." Many, again, allege that the advance has been due to an "increase in the world's armaments" and "governmental extravagance" in general; the cost of the South African and Russo-Japanese wars; the increasing public burden of maintaining social and economic reforms; investments in public undertakings, such as railways, public works, etc. The operations of trusts, combines, and trade agreements are also stated to be the prime cause. Some, on the other hand, emphasise the evil results of over-capitalisation, and others point to the increased wages, shorter hours, and diminished output resulting from trade-union conditions. The increase of middlemen and of middlemen's profits, the substitution of modern methods of soliciting business by commercial travellers, and

expensive advertising are other alleged causes, as also are the concentration of population in cities and the emigration from food producing localities; increased consumption of food products; droughts; the increased cost of primary products because of higher land values and wages; the increased cost of transport as production is pushed into regions not readily accessible; the progressive exhaustion of natural resources and the reduction of soil fertility.

Almost equally diverse are the proposals as to remedies. These range from suggestions as to currency-reform to "raising potatoes on empty city allotments." In the Continent of Europe there are movements demanding lower duties on food and the importation of frozen meats, while another proposed remedy is a lowering of the monetary (though not necessarily the physiological) standard of living, that is, a resort to a "simpler life."

Before any adequate discussion of the situation is feasible, however, *it is necessary that price-fluctuations should be accurately measured,* and such measurements should precede any attempt to remedy the condition of things. Hitherto no systematic and comprehensive effort has been made to exhaustively measure the course and extent of price fluctuations in Australia, or to examine the subject with that breadth of view which is now necessary. It is the primary object of this Report to meet, to some extent, the deficiency and furnish measurements of price-fluctuations for past years and for the present moment, in so far as the limitations of a due economy and expedition permit. This special object of the Report has been carried out in close connection with the organisation of the Labour and Industrial Branch of this Bureau, with a view to ensuring that the periodic statements as to prices, the issue of which is to be commenced in the near future, will be directly comparable with the figures furnished in this Report for past years.

2. **Scope of Investigation.**—It has, apparently, been generally assumed that the relations between import, wholesale and retail prices are so close that results based on either of the first two may be taken as, in some measure, directly proportional to, and as indicating with a fairly close degree of accuracy, changes in the cost of living. This assumption appears to be due largely to the fact that import and export and wholesale prices are the more readily accessible, and one or the other has therefore been ordinarily selected as the medium for the purposes of an inquiry into cost of living. The assumption is clearly not justified by the facts, and it may well be asked whether a result based upon import and export or wholesale prices of commodities can be said to indicate changes in the *general* purchasing-power of money, seeing that the great majority of the people make their purchases retail and not wholesale. A further qualification of the value of results based on import and export or wholesale prices as a test of cost of living is that they include mainly material things, and exclude largely labour cost and payments for services, as well as rent.

A careful examination made in this Bureau of methods followed in other countries and of the principles involved, and the unsatisfactory nature of general statements, have led to the organisation of a more comprehensive and systematic means of treating the subject of prices. It was decided that in order to furnish anything like an adequate basis for investigations into the question, from different points of view and

for different purposes, it was necessary to follow the fluctuations of the following, viz. :—

(a) *Retail Prices.*
(b) *Wholesale Prices,* and
(c) *Import and Export Prices.*

For example, for the purpose of investigating any relation between prices and the increase in the production of gold, import and export prices, which include the cost of commodities for which there is a world-wide market, are to be preferred: as reflecting trade and industrial conditions, wholesale prices, representing the cost of commodities, both raw and manufactured, in bulk, are the most suitable: while as an indication of the cost of living, retail prices, which represent the actual cost to the consumer, are the most appropriate.

The main object of this Report is to furnish for past years particulars relating to each of the three main divisions of the subject. This has been done with a view both to providing a proper basis with which records for the current and future years may be compared, and also to publishing the results of the investigations which have been made into a subject to which such special interest is attached at the present time. It will be found that each of the main divisions—(a) Retail Prices, (b) Wholesale Prices, and (c) Import and Export Prices are dealt with separately in this Report; the results are then compared, both with each other, and with results of various inquiries which have been made in other countries.

Before proceeding to discuss, individually, or in any detail, the plan and scope of any of these main lines of investigation, it is desirable that certain general matters of procedure and technique should be briefly touched upon, for the benefit of those who desire to so inquire into the matter that its full significance shall appear; for it will be shewn hereafte that the wide diversity between results obtained by various investigators are due in part to certain erroneous, though wide-spread, assumptions regarding the arithmetical technique of deducing price-indexes.

3. **General Plan of Investigation.**—One of the first steps taken in regard to the present investigation was the examination of all available material bearing on the subject. This necessarily involved the study of a large number of Reports, as well as of much current literature bearing on the subject. [A bibliographical reference to some of the various books, reports, and other documents referred to or used in this investigation, may be found in Appendix I. hereof.] The methods of technical computation and the presentation of facts had to be carefully weighed, as to whether and how far they were in accordance with fundamental principles and were suited to present requirements, as altered or necessitated by recent progress.

Concurrently with this investigation, steps were taken to ascertain what information, as to prices in Australia, was already available from various sources, and to ensure the collection of systematic and reliable records for the current and future years. The general plan followed in each of the three main branches of inquiry, viz., (a) Retail, (b) Wholesale, and (c) Import and Export Prices, was to select for each branch a comprehensive list of suitable commodities, and to trace the course of prices for each commodity year by year.

(a) As regards *Retail Prices,* information available was found to be meagre and unsatisfactory; and, as these prices depend largely upon local conditions, it was decided to collect, *de novo,* information for the whole of the Commonwealth period (since 1901, inclusive) for 46 commodities (to which house-rents were also added) from thirty important centres of population in Australia. As will appear hereinafter, these prices refer to the "predominant" or most frequently sold class, grade, or quality of each commodity. Existing data for years prior to 1901 were found to be available from official reports for the towns of Sydney and Hobart only. Index-numbers based on these data, which were, however, only for a limited list of commodities, have accordingly been worked out, and are shewn from the year 1911 as far back as 1850 and 1881 respectively (in addition to the index numbers already referred to for the Commonwealth period).

(b) As regards *Wholesale Prices,* an attempt was first made to compile (from market reports, etc.) prices of a representative list of commodities for the capital town of each State; as it was found impossible, however, with due regard to uniformity in class and quality, to obtain comparable returns for other than a very limited list, this attempt was abandoned, and the prices were traced back as far as the year 1871 for 80 representative commodities in Melbourne. This involved a considerable amount of research, and, in the first instance, has been restricted to results readily procurable, viz., those for the Melbourne markets only. It is believed that the general conditions affecting wholesale prices throughout the Commonwealth are fairly well reflected in the Melbourne markets. Thus, these prices afford a representative basis for the whole Commonwealth for the purpose of the investigation. The prices refer generally to definite grades or qualities of the various commodities.

(c) As regards *Imports and Exports,* the prices furnished by dividing the total *value* of imports or exports, as the case may be, by the total *quantity* are of a nature of a general average for all classes or qualities of the several commodities; these prices were computed for 44 representative commodities of the nature of raw materials back to the year 1901.

The methods adopted in each of these three branches of the inquiry are set out in the appropriate parts of this Report.

4. **Local and International Variations in Exchange-Value of Gold, Price-Ratios, and Price-Indexes.**— Economic observers of the last century have directed a considerable amount of attention to the periodic rise and fall of prices, a phenomenon not peculiar to any one country, but world-wide in its incidence. Obviously, the accurate measurement of this variation in its widest aspect, if possible, is of the highest importance. This variation is observable in countries whose staple commodities are very diverse, for example, countries whose staple is rice and those whose staple is wheat, as well as in countries where large sums are spent, for example, on opium, and in others where capital is invested in industrial enterprises. If a precise measurement is to be obtained of variations in prices under

such diverse conditions, it must be through some medium which can be brought into relationship with all commodities. This measurement is obtained from observations of the fluctuations in the exchange value of *money*.

The *exchange-value* or *purchasing efficiency of money* is measured by the amount of any commodity which a unit of money will purchase, the latter, of course, varying directly as the former, and inversely as the price of the commodity. Thus, if the price of tea was doubled during any period, then a unit of money would only purchase half as much tea as before, and the "exchange-value" of money in relation to the commodity, tea, would be halved.

If one commodity only, or, at the utmost, only a few in fixed proportions, were being considered, then it might not be difficult to obtain a very reliable estimate as to the fluctuations in the purchasing efficiency of money. But the list of commodities to be considered is enormous, and the problem is complicated by the fact that this list is constantly being extended in ways that cannot be anticipated. For example, the cycle industry is the growth of fifteen years only, and the rubber industry of ten. Other commodities also for which formerly there was a great demand have gone out of general use. Suppose a comparison is to be instituted between two periods, which we will call year 0 and year 1 respectively. Suppose that the price of a unit of a certain commodity was $a$ at the first period and $a^1$ at the second. The price-ratio of the commodity at the second period as compared with the first would be denoted by the fraction $a^1/a$.

The method which has been most in vogue amongst economists during the last half-century for determining the fluctuations in the purchasing efficiency of gold has been the *determination of a price-index* based upon a series of price-ratios. As both of these terms will be frequently used in the demonstrations which follow, a definition of them is appended.

For example, suppose that in 1901 the average price of butter was 1s. 3d. per lb., and in 1911 the average price had risen to 1s. 6d. per lb., the price-ratio in 1911 of butter, as compared with 1901, would be 1s. 6d. ÷ 1s. 3d. *i.e.*, $\frac{18}{15}$ or $\frac{6}{5}$. The price-ratio in 1901, as compared with 1911, would be the reciprocal of this, that is, 1s. 3d. ÷ 1s. 6d., or $\frac{5}{6}$.

If all commodities were equally important in the scale of expenditure (which, of course, is *not* the case), then the determination of the effect caused by a rise or fall in prices would be a comparatively simple matter. Different commodities are really far from being of the same economic importance. Cotton, for example, is much more important than silk, and brandy less so than tea. Many economists, who recognise this difference of importance, endeavour to give expression thereto by means of a series of "weights" or multipliers.* The price-ratios are then multiplied by them, each by its appropriate "weight," and the sum of the products is divided by the sum of the weights. The result gives what may be called a weighted *price-index*. The reciprocal of a *price-index*, properly determined, would be the measure of the relative purchasing efficiency of gold between the two periods.

* In other words the price-ratio of any given commodity is counted several times over, viz., as many times as is represented by the multiplier.

This can be illustrated by an example. Suppose that between two periods the average price of tea rose from 1s. 3d. to 1s. 6d. per lb., and the price of bread rose from 3d. per 2-lb. loaf to 3½d. per 2-lb. loaf. The price-ratio of tea would be $\frac{6}{5}$, and that of bread, $\frac{7}{6}$. If, however, bread, owing to its greater economic importance, exerted twice as much influence on expenditure as tea, then the price-index would be

$$\frac{(\frac{6}{5} + (2 \times \frac{7}{6})}{1 + 2} = \frac{53}{45} = 1.18, \text{ nearly.}$$

The method of price-ratios has been used extensively by economists, different methods of weighting being employed. Dutot, for example, weighted his price-ratio with the prices of units of the different commodities at the first period under review. Carli used equal weights for his price-ratios—that is, he assumed that all commodities had an equal influence on prices—an assumption that is obviously invalid. Yet the well known index-numbers of the London "Economist" have, till quite recently, been computed on this hypothesis. Young weighted his price-ratios with the total exchange-value of the commodities at some period, and Scrope used the number of mass-units—that is, the price-ratio for each commodity is multiplied by a number indicating the relative extent to which the commodity is used.

It is impossible to study the tables drawn up in accordance with the theory of price-ratios without being struck with the discrepancies exhibited. Tables, purporting to shew the variations in price in the same country over the same period of time, will shew the greatest differences in the ratio with which prices are rising and falling, and sometimes one table will shew a rise, whilst another will shew a fall This arises partly from the different lists of commodities adopted, partly from differences in the weighting, and partly from defects inherent in the method of price-ratios itself.

A serious defect in the use of price-ratios is that the results obtained are *irreversible,* as price-indexes are usually calculated. By this is meant that if the price-index, say, between 1901 and 1911 (1901 being taken as the basic year) was found to be I., then the price-index between 1911 and 1901 (1911 being taken as the basic year) should be $\frac{1}{I}$, but, *as a matter of fact, it never is,* except in a variation of Scrope's method, when the weighting is according to the geometric mean of the two expenditures, a method somewhat tedious, arithmetically. Taking the former example of the bread and the tea, where, as before, the respective weights are 2 and 1. Let us this time take the second period as our basic period. The two price-ratios become $\frac{5}{6}$ and $\frac{6}{7}$, and the price-index ought to become $\frac{1}{1.18}$ or expressed as a decimal, 0.8490. As a matter of fact,

$$\text{we get price-index} = \frac{(\frac{5}{6}) + (2 \times \frac{6}{7})}{1 + 2} = \frac{106}{127} = 0.8492$$

Though this sensibly agrees with the preceding (0.8490), that fact is but accidental, for if the two price-ratios were further apart in actual value, the differences between the two price-indexes would have been much greater. Suppose, for example, the two price-ratios in the first case were $\frac{5}{6}$ and $\frac{1}{6}$, we should have

$$\text{I.} = \frac{(\frac{5}{6}) + (2 \times \frac{1}{6})}{1 + 2} = \frac{7}{18} = 0.389$$

the second price-index should be $\frac{18}{7}$. i.e., 2.571, but it really becomes

$$\frac{(\frac{6}{5} + (2 \times 6)}{1 + 2} \text{ i.e., } \frac{66}{15}, \text{ or } 4.4;$$ a very wide divergence.

In order to obviate the theoretical defect in this method, it is desirable to avoid the use of price-ratios altogether as a means of establishing price-indexes. But before doing this it is well to notice which of the different weightings, that have been adopted from time to time in conjunction with price-ratios, lead to the best results. It will be found that one of the many variations of Scrope's method most nearly satisfies the test of reversibility. In Scrope's method, the price-ratio for every commodity is multiplied by the number of mass-units used, and these are taken as the weights, it being assumed that the same number of mass-units is used at both periods under comparison. If now the number of mass-units of any commodity be multiplied by the price per mass unit, this gives the aggregate expenditure per commodity. Scrope's method, consequently, gives us the ratio of the aggregate expenditure for the two periods, assuming that equal mass-units are used in both. From this idea it is only one step to the method of computing price-indexes which has been used in this Report. The essential feature in this is that a fixed list of commodities is drawn up, and it is assumed that a definite number of mass-units of each is consumed every year. The definite number fixed upon must be chosen carefully with a view to the relative importance and availability of each commodity. For example, the amount of pig-iron would be estimated in tons, and the amount of radium in milligrams. It is desirable that the list of commodities should be of international usage. This body of commodities in definite amounts would constitute what might be called the "complex economic unit," or briefly the economic unit. The ratio which the aggregate expenditure upon this "economic unit" every year bears to the aggregate expenditure thereon for the basic year constitutes the price-index for the former year, and the price-index is the inverse measure of the ***purchasing efficiency of gold***. This will be denoted the *"aggregate expenditure method."*

In order that an inquiry adequate to the importance of the subject should be conducted, an examination has been made into the price-ratio methods of computing price-indexes associated with the names of Dutot, Carli, Evelyn, Young, Scrope, and Drobisch. A further investigation has been made with the object of establishing the mathematical justification for the use of the "aggregate expenditure" method of computing price-indexes, and the necessity for the establishment of the standard international list of commodities and the "complex economic unit." The results of these investigations are embodied in Appendixes VIII and IX., to which any inquirer wishing to thoroughly understand the subject is referred.

5. **Aggregate Expenditure Method Adopted in this Report.**—For the reasons indicated briefly above, and set out more fully in Appendices VIII. and IX. hereof, the index-numbers presented for Australia in this Report are based on the aggregate expenditure method,* and represent the ratios between the total aggregate cost of definite quantities of a number of commodities at a given date and the price of

* See formula (2) in Appendix VIII.

the same quantities of each commodity at some other date selected as a base or standard; each of these ratios is then multiplied by 1000. To make this clear, it will be well to first take a simple numerical example. Suppose that in 1901 the average price of butter was 1s. 3d. per lb., of bread was 3d. for 2lb. loaf, of mutton was 3d. per lb., and of milk was 4d. per quart; and suppose that in 1911 the prices of these four commodities were 1s. 6d. for butter, 4d. for bread, 5d. for mutton, and 5d. for milk. Now the total quantities of each of these commodities consumed in Australia per annum are approximately 90 million lb. butter, 470 million 2lb. loaves bread, 330 million lb. mutton, and 300 million quarts of milk. Therefore, the actual expenditure of the people of Australia on these commodities in 1901 and 1911 respectively would be as follows:—

**Computation of Index Numbers: Illustrative Example of Aggregate Expenditure Method.**

| Particulars. | Unit. | Quantities Consumed (0,000,000 omitted). | Prices. | | Total Expenditures. | |
|---|---|---|---|---|---|---|
| | | | 1901. | 1911. | 1901. | 1911. |
| | | | *d.* | *d.* | *d.* (0,000,000 omitted) | *d.* (0,000,000 omitted) |
| Butter .. | lb. | 9 | 15 | 18 | 135 | 162 |
| Bread .. | 2lb. loaf | 47 | 3 | 4 | 141 | 188 |
| Mutton .. | lb. | 33 | 3 | 5 | 99 | 165 |
| Milk .. | quart | 30 | 4 | 5 | 120 | 150 |
| | | | | | 495 | 665 |

The relative aggregate expenditure was 495 in 1901, and rose to 665 in 1911; in other words, the index-number in 1901, taking the expenditure in 1911 as the base (= 1000) was $\frac{495}{665} \times 1000 = 744$, and the index number in 1911, taking the expenditure in 1901 as the base (= 1000) was $\frac{665}{495} \times 1000 = 1343$, which might, of course, have been obtained directly by taking the reciprocal of the result previously obtained. If now, instead of only four commodities, a representative group of fifty or more were treated in this way for a series of years, the numbers thus obtained would furnish a satisfactory index of the variations in price from year to year.*

In view of the fact that the above method of computing index-numbers is different to the methods ordinarily adopted by statisticians and economists, it is desirable to refer briefly to certain fundamental principles underlying the question.

The various commodities which are required in the civilised world may be roughly classed under the following heads, viz.:—(a) Food; (b) Clothing; (c) Furniture, Tools and Utensils; (d) Housing; (e) Miscellaneous. Under these various heads may be classed items susceptible of more or less exact definition and evaluation as to price. Not all commodities are equally important in any division; for example, a staple commodity such as flour as compared with a commodity used merely for flavouring, such say as nutmegs.

* See formula (2) in Appendix VIII.

There are several senses in which things are important, for example, from the standpoint of hygiene, or merely from that of actual usage. With the latter we are alone concerned, and since money (gold) is the *medium of exchange,* and everything being expressed in relation thereto by its *price,* or the quantity of money that a unit of the commodity costs, it is the one commodity in which the value of all others is immediately expressed.

Now to express quantitatively the relative importance of commodities we must have regard to the average relative expenditures thereon. In economic inquiries of the kind under consideration we are thus really concerned only with the actual habits of the people in regard to the number of units of each commodity, that is to say either the relative quantities of the commodities or the relative expenditure upon them. The intrinsic value or necessity is quite another question, as is obvious in comparing, for example, food and house equipment, one of which is a necessity and the other to some extent a convenience.

The relation of the money unit to commodities, expressed as price, constitutes the data for the investigation, and the *fluctuations in price* shew the variation of the *purchasing power* of the money unit (£1). As already pointed out, the measure of the importance of a fluctuation in the price of any commodity is the measure that the expenditure on the commodity bears to the expenditure on the whole group. The practice has arisen of deducing a general measure of the fluctuation by computing the *price-ratios* for a series of commodities, the price-ratio being found by dividing the price at any time by the price at some other time arbitrarily selected as the base or standard. Commonly the number so found is multiplied by 100 or 1000, so that the number minus 100 or 1000, as the case may be, represents the rate of increase on 100 or on 1000. Each price ratio is then "weighted," that is to say, is multiplied by a number representing the importance of the commodity based on the total relative value of the commodity consumed. The sum of these weighted results divided by the sum of the weights gives the weighted index number.*

Many economists, however, recognising that the attribution of different degrees of importance to different commodities involves a considerable amount of arithmetical labour, have advocated the practice of simply taking the arithmetic mean of the price-ratio under the impression that this was sufficiently accurate.†

As shewn in Appendix VIII. hereof, both of these methods are invalid and yield incorrect results, and for that reason neither of them has been followed in the computation of the price-indexes given in this Report for the Commonwealth. The method of simply taking the mean of the price-ratios (unweighted) cannot be justified theoretically under any circumstances, and the method of using weighted price-ratios gives correct results only if the geometric, and not the arithmetic, mean of the weighted products is taken.‡ The computation of the results by taking the geometric mean involves, however, a considerable amount of arithmetical work, and is neither so direct in its application nor so readily understood as the "aggregate expenditure" method adopted in this Report. Moreover, there is no ground on which any other method can be regarded as preferable to the "aggregate expenditure" method.

* See formula (10) in Appendix VIII. † See formula (22) in Appendix VIII.
‡ See formula (11) in Appendix VIII.

In order to exhibit arithmetically the value and reliability of the different methods, a careful examination was made as to the index-numbers computed by the several methods for the wholesale prices in Melbourne of 73 commodities in 1871 computed with prices in 1911 as base (= 1000). The results were as follow:—

**Price-Indexes, Examination as to Reliability of Various Methods.**

| Particulars. | Aggregate Expenditure Method.* | Weighted Price-Ratio Method (Geometric Mean).† | Weighted Price-Ratio Method (Arithmetic Mean).‡ | Unweighted Price-Ratio Method.§ |
|---|---|---|---|---|
| Index Number for 1871 with 1911 as base year (= 1,000) .. .. | 1,194 (valid). | 1,195 (valid). | 1,289 (Invalid). | 1,310 (Invalid). |

* See Formula (2) in Appendix VIII. † See Formula (11) in Appendix VIII. ‡ See Formula (10) in Appendix VIII. § See Formula (22) in Appendix VIII.

It may be seen that the results obtained by the first two methods are almost identical. Moreover, it is shewn in Appendix VIII. that these results are *reversible,* that is to say by taking the reciprocals of the index-numbers thus obtained with the year 1911 as base, the same result is obtained for the index-number for 1911 with the year 1871 as base, as is obtained by calculation from the original data, and *vice-versa.* As will appear hereinafter *this question of reversibility is of great importance. In neither of the other cases are the index-numbers reversible,* and, further, the differences between the last two results are considerable, and they both differ widely from the uniform results obtained by the first two methods.

The matter is so important that it has been thought desirable to discuss it at length. It will suffice here to remark, primarily, that it is obvious that the actual commodities, and the quantities thereof used, will affect the result obtained. It is therefore necessary first of all to inquire how many units of each commodity a community uses on the average. A list shewing both the commodities and the number of units used might properly be called the *regimen* on which any deductions are based. This *regimen* is important, and constitutes a necessary foundation for the deduction of the variations in the exchange-value of the money unit. The common-sense and obvious way of measuring these variations is to multiply the price of each of these commodities by the corresponding number of units used of that commodity in the *regimen,* and finding the sum of these products. The total so found gives an aggregate cost, and the ratio of the aggregate cost of any year to the aggregate cost for the initial or basic year furnishes the price-index required. Ordinarily it will be convenient to multiply it by 100, 1000, 10,000, etc., according to the precision required. In this Report each result has been multiplied by 1000.

We may call the regimen indicated a *complex-unit*: and in this scheme it is the varying price of the complex-unit with which we are concerned. No better measure than this can be found for deducing the variation of the exchange-value of the money unit (£1).

Here it may be said that figures deduced for this purpose may be misleading simply because the list of commodities *was not well chosen,* or because the mode of calculating was not satisfactory, or for both reasons together. The whole question divides itself, therefore, into two

branches, viz.—(a) the inquiry into what should be the list of commodities and the number of units used on the average; and (b) the technique followed in the computation of results. The latter being of high importance, but somewhat technical, has been dealt with in an Appendix, and will not further be referred to except therein. (See Appendix VIII.) It will suffice here to say that the method of basing deductions directly on aggregate expenditure has been preferred to that of basing them on price-ratios for the reasons already referred to, and which are more fully set forth in Appendixes VIII. and IX.

## II. RETAIL PRICES, HOUSE RENT AND COST OF LIVING.

1. **General.**—Cost of living is affected by two things, viz.—(i) *Variation in the units and items of the regimen,* i.e., change in the standard of living, which strictly includes also changes in quality or class of commodity consumed; and (ii.) *Variation in the exchange value of gold,* since this affects the *cost* of any regimen whatsoever. With the former question, viz., standard of living, this investigation is not immediately concerned. That is a matter for determination by the analysis of household budgets or in some other appropriate manner; the latter remains to be considered.

Assuming, then, for the present that the regimen is exactly defined, then cost of living may be measured by the amount of money necessary to purchase it, that is to obtain definite amounts of food, clothing, housing accommodation and other necessaries, as well as comforts and luxuries. It will therefore be seen that in order to measure variations in the cost of living it is essential to obtain accurate and representative record of three things, viz.:—

(a) The nature of the commodities, requirements and services ordinarily bought or paid for by the mass of the community.

(b) The relative quantity or extent to which each item is on the average consumed.

(c) The prices at which these items are bought or paid for by the consumers.

Before discussing these three questions in detail it is desirable to refer briefly to certain general considerations concerning the value and utility of index-numbers based on Retail Prices.

It has been alleged by various economists and statisticians that the formation of reliable and useful index-numbers based upon retail prices is precluded by the following considerations, viz.:—

(a) The absence of standardisation of grades and of standard retail quotations for the same article over a series of years.

(b) The rapid variations in the quality and the general nature of retail articles, which are powerfully influenced by changes of fashion and the varieties of production; and

(c) The local and non-typical character of retail prices.

To meet the last of these objections first, it may at once be stated that the matter of obtaining typical or representative prices is merely one of statistical organisation, and, as will appear hereinafter, steps have been taken to ensure that the quotations which have been, and are being,

collected in Australia are such as will afford a satisfactory basis for the computation of prices of a representative character. It will be seen later that the prices actually collected refer to those classes, qualities, or grades of commodities most frequently sold. While it is true that the grades are not in all cases well standardised, by obtaining the "predominant" or "most frequent" prices, an average price applicable to the purchases of the masses of the community may readily be computed. Furthermore, the objection raised to the absence of standardisation and the rapidity of variations in the quality of commodities, due to changes in fashion and other matters, must equally apply to wholesale prices, since practically all commodities, and all classes and grades thereof, which are sold retail are also sold wholesale.*

The regimen may be changed either in respect of quantity or quality. Change in quantity ordinarily takes place slowly, and it is not of importance in an investigation extending over only a small number of years; it must be met by a periodic revision of the "mass-units" or the "weights." Change in quality is continually taking place in regard to all commodities, and nearly every two samples of a commodity would be found, on strict analysis, to differ (*e.g.,* in chemico-physical analysis). The question is really only one of degree, and each case must be decided on its merits. If the objection that strictly applies, viz., that change of quality must invariablv be taken into account, were allowed to have weight, we should be landed in an absurd position, viz., that no deductions could strictly be made. It is of importance, therefore, to notice that, by the device of obtaining the "predominant" or "most frequent" price, the class, quality or grade of commodities comprised in the regimen always refer to that class, quality or grade which is most frequently sold. The method, though not theoretically perfect, has distinct advantages.

This may be explained in the following manner:—Suppose that in an investigation into prices, either wholesale or retail, certain grades or qualities of commodities have been selected as representative of the grades or qualities most commonly used, and as furnishing typical price movements for the several commodities included in the regimen, and suppose that owing to a change in quality or in the habits of the people these selected grades cease to be representative either of the quality consumed or of the price movements, then the successive index-numbers, being based on a regimen which no longer prevails, cease to be of value If, however, the data collected referred to the "predominant" or "most frequent" prices, then the prices obtained continually relate to the grade or quality most frequently used, whatever that grade or quality may be. Of course, in the case of certain commodities in regard to which all the varieties of production and all the changes of fashion have their full influence, it may be impossible either to select any grade, which is representative in quality and which truly reflects changes in prices, or to determine any quality which is most frequently sold. It is for this reason that certain commodities, such as clothes, boots, furniture, etc., have been excluded from the present investigation. It appears, therefore, that the objections which have been raised to the formation of an index-number based on retail prices are not valid, and that, in any case, they apply equally to one based on wholesale prices.

* This is generally true with the exception of a few commodities such as clothes made to order and a few other special commodities, in the making of which skill or personal service plays an important part.

The matter is one of such importance that it may again be pointed out that the scope of this part of the Report is limited to the consideration of variations in *expenditure on a definite regimen or schedule of living*. The questions of variations in the constituent parts of that regimen or schedule and of variations in the extent of the means of defraying the expenditure must be left for future consideration. And it may here be remarked that as regards the latter matter, viz., the extent of the means of defraying the expenditure, it is intended to issue, in the course of a few months, a further Report which will embody *inter alia* the results of investigations which have been made into the course of wages during past years; for future years reliable and comprehensive returns will be collected, and index-numbers will be published, for wages paid in various industries and localities, as well as for the whole Commonwealth.

In regard to the former of these two matters, viz., variations in the composition of the regimen, it is proposed to collect from time to time household budgets, the analysis of which will furnish reliable information as to *distribution of actual expenditure*. In all investigations care must be taken to discriminate between a change in the *standard* of living and a change in the *cost* of living, in so far as this is possible without descending to minutiae which are insignificant for the end in view.

**2. Commodities and Requirements included.**—The first step in the inquiry proper was to decide what commodities, requirements and services should be included. An investigation carried out by the Bureau in 1910-11 into the "Cost of Living," comprising the expenditure of 999 persons, disclosed the fact that the distribution of family expenditures is as follows, viz.:—

(a) *Rent*, 16.3 per cent. (13s. 3¾d.) on the total expenditure (£4 1s. 10¼d.).
(b) *Food,* 28.4 per cent. (£1 3s. 3¼d.);
(c) *Clothing,* 12.3 per cent. (10s. 1¼d.);
(d) *Fuel and Light,* 3.4 per cent. (2s. 9d.); and
(e) *Other Items,* 39.6 per cent. (£1 12s. 5d.).

Though the standard of living, or regimen at any particular date, varies for different classes of people in the same country, and though differences occur in the modes of living of people even of the same class, and in the same locality, yet the fact that the figures just given are representative of the mass of the people is borne out by collateral investigations that have been made in this Bureau. Thus the average rent in 30 chief towns of Australia as determined from agents' returns is 12s. 4d., as compared with 13s. 3¾d. obtained from the Cost of Living inquiry referred to.* Again from import, export and production statistics it is found that the average weekly expenditure per head of population is—On Meat, 1s. 2½d. per head; on Bread, 5⅝d.; Milk, 5$\frac{1}{16}$d.; and on Tea, Coffee and Cocoa, 2$\frac{5}{16}$d.; while the corresponding amounts computed from the "Cost of Living" investigation were as follow:—1s. 1d. per head on Meat, 6d. on Bread, 6¾d. on Milk, and 2¼d. on Tea, Coffee and Cocoa. It is clear, therefore, that the above distribution of expenditure may be taken as representative, with a close degree of precision, of the whole community.

* The difference is probably due largely to the fact that nearly one-half of the families included in the "Cost of Lving" inquiry had incomes of over £200.

Now the object of the present investigation being to obtain results representative of variations in the cost of living, due to price fluctuations, in the community as a whole, the plan (subject to the limitations referred to below) was to include as many commodities, etc., as possible, such as were suggested by reference to the character of the more universal needs of the mass of the people. In making the selection, however, it was considered desirable to have due regard to the following limitations:—

(a) In the first place, it was not intended for the purpose of this inquiry to include in the term "cost of living" the cost of satisfying all of the more universal needs of the people, but only that of ordinary necessaries and conventional comforts.

(b) Secondly, it was desired to avoid unnecessary duplication, *e.g.*, it was not considered necessary to include prices of both ordinary flour and self-raising flour.

(c) Thirdly, it was not desired to include commodities in which the grades or qualities vary to such an extent that definite "predominant" or most frequently sold qualities or grades could not be determined with precision by the persons furnishing the data.

(d) Lastly, since (as has already been pointed out, see pp. 11, 12) the technique followed requires that the extent to which each commodity included is used should be known, it was not desired to include those commodities for which no information as to relative usage or consumption was available.

On reference to the results, given on page 17 hereinbefore, of the "Cost of Living" inquiry it will be seen that, excluding expenditure on "other items," by far the most important branch of expenditure is that on "Food," followed, in the order named, by rent, clothing, and fuel and light. Commodities comprised under the head of "Clothing" have been entirely omitted from this investigation, owing to the impractability of obtaining periodic prices for predominant grades and qualities and of satisfactorily determining the relative importance of the various items (see paragraphs (c) and (d) above). For the same reasons commodities comprised under the heading "Fuel and Light" have also for the present, at any rate, been excluded. In country districts wood is extensively used, while gas, coal and electricity are practically not used at all; again, in urban districts the consumption of wood as fuel is comparatively small, while gas is used both as an illuminant and as fuel.

The expenditure on "other items" comprises amounts spent on other groceries not food, beverages, tobacco, fares, insurance, contributions to benefit societies, education and school materials, medical expenses, rates and taxes, sports and amusements, furniture, and all other expenditure. It is, of course, obvious that in regard to many of these items, prices cannot be collected; the expenditure upon them is moreover largely a matter of individual taste or caprice. Prices of "other groceries not food," including kerosene, are included in this investigation; the expenditure on these items amounts to nearly 3 per cent. on the total expenditure. All other items in this group have been advisedly excluded from the present investigation, viz., for one or more of the reasons specified above.

It may now be seen that the scope of this inquiry includes expenditure on (a) Food, (b) House Rent, and (c) Other Groceries not Food, comprising approximately 48 per cent., or nearly one-half, of the total expenditure of a normal family. The only important branch of expenditure which is entirely excluded is "Clothing;" *necessary* expenditure on clothing does not, however, vary greatly from year to year, and expenditure on clothing other than what is necessary in accordance with an individual's station in life may well be looked upon as expenditure on a luxury. Variation in expenditure on clothing due to price fluctuations is, in fact, indeterminate owing to the influences of individual taste, fashion, and immense variety in production. Finally, in respect to this item, it may be pointed out that the question of "change of standard," so largely enters into the result, that the appropriate method for determining change in the cost of clothing is the householder's budget only.

Investigations have proved that the percentage of expenditure on food is far greater in families having small incomes than in those having larger incomes, thus indicating that economies in expenditure are primarily effected in regard to matters other than food. The same is true, but to a less extent, in the case of house rent, while, on the other hand, the relative expenditure on amusements, luxuries, and miscellaneous matters is far greater in the case of families having large incomes. Expenditure on clothing remains at a fairly constant percentage in all families grouped according to income. Now these facts shew that, in so far as expenditure on living is affected merely by changes in prices, the proper branches of expenditure to be primarily investigated are those relating to food and house rent, since it is shewn that these needs are the first to be satisfied, the surplus, after their satisfaction, being expended in other ways; in other words, the regimen in regard to food and house rent is substantially constant, while the regimen in regard to other items of expenditure is, to some extent, dependent upon variations in price of those commodities and services (in regard to which the regimen is constant) which have first of all to be paid for. The effect of change in prices on cost of living should obviously, therefore, be primarily investigated from the standpoint of those commodities, for which the need is first satisfied, and in regard to which changes in price thus have their full influence on the totality of purchases which can be made with a fixed income. The result is that those items of expenditure which have been excluded from this investigation do not adversely affect the validity and utility of the index-numbers computed to shew the variation in cost of living due to price-fluctuations. The truth of the matter is that if all branches had been included a fictitious result would have been obtained, since total aggregate expenditure is fixed and does not, in the majority of cases, vary with prices, and, therefore, the distribution of expenditure on luxuries, amusements, etc., does not contribute a substantially constant regimen, but one which has to be restricted to the surplus available after payment for food, housing accommodation, other necessaries, and conventional comforts. In other words, the regimen in regard to such comforts and luxuries varies inversely as the prices paid for the needs that are first satisfied, and it is the price of these needs which has the predominating influence on the distribution of aggregate expenditure and on the cost of living. Moreover, as has been pointed out elsewhere

pp. 11-12, the method of comparison by index-numbers is valid only if the regimen be constant or *pro tanto* for that part of a regimen which is constant. The inclusion of expenditure on clothes, luxuries, amusements, and other matters is, however, of course essential in any inquiry into distribution of expenditure, that is, regimen or change in *standard* of living, a matter with which, as has already been stated, (see para. 1) this Report is not concerned.

The various items comprised in this investigation may be conviently grouped under the following four heads:—

**Retail Prices—Commodities, etc., included in each Group.**

| I. GROCERIES. (18 Commodities). | II. DAIRY PRODUCE. (7 Commodities). | III. MEAT. (21 Commodities, Joints, etc.). | IV. HOUSE RENT. (Weighted Averages). |
|---|---|---|---|
| 1. Bread. | 1. Milk. | 1 Beef (Fresh) Sirloin. | (The rents used in the computation of the index-numbers given in this Report represent, except where otherwise stated, the weighted average rent for all houses, obtained by weighting the predominant rents for houses of each different size by the number of houses of that size in each particular town. Index-numbers based on rents of houses of any particular size can, of course, be specially computed from the data furnished in this Report and the Appendixes thereto.) |
| 2. Flour. | 2. Butter. | 2. ,, ,, Rib. | |
| 3. Tea. | 3. Cheese. | 3. ,, ,, Flank. | |
| 4. Coffee. | 4. Eggs. | 4. ,, ,, Shin. | |
| 5. Sugar. | 5. Bacon (Mid. Cut). | 5. Steak ,, Rump. | |
| 6. Rice. | 6 ,, (Shoulder) | 6. ,, ,, Shoulder. | |
| 7. Sago. | 7. Ham. | 7. ,, ,, Buttock. | |
| 8. Jam. | | 8. Beef (Corned) Round. | |
| 9. Oatmeal. | | 9. ,, ,, Brisket with bone. | |
| 10. Raisins. | | 10. ,, ,, Brisket without bone. | |
| 11. Currants. | | 11. Mutton, Leg. | |
| 12. Starch. | | 12. ,, Shoulder. | |
| 13. Blue. | | 13. ,, Loin. | |
| 14. Candles. | | 14. ,, Neck. | |
| 15. Soap. | | 15. Chops, Loin. | |
| 16. Potatoes. | | 16. ,, Leg. | |
| 17. Onions. | | 17. ,, Neck. | |
| 18. Kerosene. | | 18. Pork (Fresh) Leg. | |
| | | 19. ,, ,, Loin. | |
| | | 20. ,, ,, Belly. | |
| | | 21. ,, ,, Chops. | |

3. **Relative Expenditure and Mass-Units.**—In order to obtain the aggregate expenditure at any period, that is the sum of the relative expenditures on the items included, it is, of course, necessary to multiply the price of each commodity by a number, called the mass-unit, which represents the relative extent* to which that commodity, and the particular unit thereof, is used. The general method followed in computing these relative numbers, or "mass-units," is the same as in the case of Wholesale Prices, that is to say, the extent of usage or consumption has in general been obtained by taking the production of each commodity in Australia and adding or subtracting the excess of imports over exports, or *vice-versa,* as the case may be. The figures have, in general, been based on the average production, and the average export and import returns, for the five years 1906 to 1910, inclusive.

* The **relative** extent is alone essential, in other words the mass units must represent the quantities used in **some** period of time common for all commodities.

(i.) *Commodities Included and Mass-Units.*—In the subjoined table particulars are given shewing the numbers thus obtained. In the third column is shewn the extent (in thousands) to which each commodity, in the unit specified, is used or consumed. The fourth column shews the relative numbers which have been adopted (in the computation of the index-numbers) as representing the extent of usage or consumption. The effect of thus "rounding-off" the mass-units to be used was specially investigated; it was found that for a regimen comprising 73 commodities taking the prices for 1871 and 1911, the index-number referred to the latter year as base obtained by using the actual figures (as shewn in column 3) was 1194, whereas the index-number obtained by using the rounded-off mass units (as in column 4) was 1193. This shews that the error caused through using the latter figures, and thus considerably shortening the arithmetical labour, is negligible.

**Retail Prices.—Table shewing Commodities, etc., included in Investigation, Units, Extent of Usage or Consumption and "Mass-Units" adopted.**

| Commodity. | Unit. | Extent of Average Annual Usage or Consumption (000 omitted). | "Mass Unit." |
|---|---|---|---|
| GROUP I.—GROCERIES (INCLUDING BREAD). | | | |
| 1. Bread .. .. | 2. lb. loaf | 468,000 | 468 |
| 2. Flour, ordinary .. | 25 lb. bags | 11,280 | 11 |
| 3. Tea .. .. .. | lb. | 30,000 | 30 |
| 4. Coffee .. .. | | 2,100 | 2 |
| 5. Sugar .. .. | ,, | 460,000 | 460 |
| 6. Rice .. .. .. | ,, | 50,000 | 50 |
| 7. Sago .. .. .. | ,, | 7,750 | 8 |
| 8. Jam .. .. .. | ,, | 73,500 | 73 |
| 9. Oatmeal .. .. | ,, | 35,000 | 35 |
| 10. Raisins .. .. | ,, | 14,000 | 14 |
| 11. Currants .. .. | ,, | 14,000 | 14 |
| 12. Starch .. .. | ,, | 1,000 | 1 |
| 13. Blue .. .. | doz. sqs. | 500 | ½ |
| 14. Candles .. .. | lb. | 16,000 | 16 |
| 15. Soap .. .. | ,, | 64,000 | 64 |
| 16. Potatoes .. .. | 14 lbs. | 64,000 | 64 |
| 17. Onions .. .. | lb. | 68,000 | 68 |
| 18. Kerosene .. .. | gallon | 17,500 | 17 |
| GROUP II.—DAIRY PRODUCTS. | | | |
| 19. Milk .. .. | quart | 300,000 | 300 |
| 20. Butter .. .. | lb. | 95,000 | 95 |
| 21. Cheese .. .. | ,, | 15,000 | 15 |
| 22. Eggs .. .. | dozen | 18,000 | 18 |
| 23. Bacon, middles .. | lb. | 16,000 | 16 |
| 24. Bacon, shoulder .. | ,, | 16,000 | 16 |
| 25. Ham .. .. | ,, | 8,000 | 8 |

Retail Prices.—Table shewing Commodities, etc., included in Investigation, Units, Extent of Usage or Consumption and "Mass-Units" adopted.—continued.

| Commodity. | Unit. | Extent of Usage or Consumption (000 omitted). | "Mass Unit." |
|---|---|---|---|
| GROUP III.—MEAT. | | | |
| 26. Beef, sirloin .. | lb. | 67,000 | 67 |
| 27. ,, rib .. .. | ,, | 82,000 | 82 |
| 28. ,, flank .. | ,, | 12,000 | 12 |
| 29. ,, shin .. .. | ,, | 14,000 | 14 |
| 30. Steak, rump .. | ,, | 24,000 | 24 |
| 32. ,, shoulder .. | ,, | 53,000 | 53 |
| 32. ,, buttock .. | ,, | 53,000 | 53 |
| 33. ,, corned round | ,, | 39,000 | 39 |
| 34. ,, brisket, with bone | ,, | 11,000 | 11 |
| 35. ,, ,, without bone | ,, | 32,000 | 32 |
| 36. Mutton, leg .. | ,, | 92,000 | 92 |
| 37. ,, shoulder .. | ,, | 62,000 | 62 |
| 38. ,, loin .. | ,, | 30,000 | 30 |
| 39. ,, neck .. | ,, | 40,000 | 40 |
| 40. Chops, loin .. | ,, | 82,000 | 62 |
| 41. ,, leg .. .. | ,, | 15,000 | 15 |
| 42. ,, neck .. | ,, | 31,000 | 31 |
| 43. Pork, leg .. .. | ,, | 9,500 | 9½ |
| 44. ,, loin .. .. | ,, | 8,500 | 8½ |
| 45. ,, belly .. .. | ,, | 10,500 | 10½ |
| 46. ,, chops .. | ,, | 8,500 | 8½ |
| GROUP IV.—HOUSE RENT. | | | |
| 47. House Rent .. | per week | 46,500 | 46½ |

(ii.) *Relative Importance of Groups.*—The relative importance of any group depends, of course, upon the expenditure on any one group in relation to the expenditure on any other group or on all groups. The relative expenditures on the groups are obtained by taking the sum of the products of the mass-units, multiplied by the corresponding prices. Since the mass-units (which represents the "regimen") are constant over the period under review, the relative importance of any group will vary to some extent according to the price fluctuations from year to year. In the following table the relative expenditures are shown on the basis of the weighted average prices and house-rents for the first nine months in 1912 in the thirty towns for which particulars are collected, the averages being obtained by weighting the figures for each town according to its population.

**Retail Prices—Relative Importance of Groups according to Weighted Average Price for Thirty Towns, 1912.**

| Particulars. | I. Groceries. | II. Dairy Produce. | III. Meat. | IV. House Rent. | All Groups |
|---|---|---|---|---|---|
| Relative Expenditure | 63,457 | 39,703 | 37,710 | 87,922 | 228,792 |
| Percentage on Total Expenditure .. | 27.7 | 17.4 | 16.5 | 38.4 | 100.0 |

These figures shew that expenditure on food and groceries amounts to 61.6 per cent. on the total expenditure, and on house-rent to 38.4 per cent. In other words, the expenditure on house-rent was (according to prices and rents in the first nine months of the year 1912) 62.3 per cent. on the expenditure on groceries and food. An independent investigation carried out by this Bureau (by means of household budgets) into the Cost of Living in 1910-11 shewed that on the average expenditure on house-rent was about 60 per cent. on the expenditure on food and groceries. The remarkable closeness of these results confirms the accuracy of the "mass-units" used in this investigation to compute the relative expenditure on the various items.

4. **Predominant or Most Frequent Prices.**—The first step to be taken towards the actual collection of the necessary data was an examination of records of retail prices already available. These were contained mainly either in

(a) Statistical registers and other official publications issued by the State Governments; or

(b) Newspaper reports of market prices.

In making this examination, the important question of variation in grades and qualities had to be borne in mind, as also had the fact that one of the essential requirements of the present investigation was to furnish prices and index-numbers on a comparable basis, not only for each State, but also in different localities within a State.

It was found that the records of prices available in official publications of the States were not generally suitable as a basis for a comprehensive inquiry on the lines indicated, inasmuch as the information published by the respective States was not on a comparable basis, either as to the scope of the commodities included or as to the nature of the prices quoted. Moreover, for some of the States practically no information was available, while in others the particulars were meagre or indeterminate owing to the prices being published as a range, without any indication of what constituted an average.

The information available from newspaper and trade reports was equally unsatisfactory, mainly for the reason that the prices quoted refer to definite grades or qualities, which were not uniform for different States or localities. In many cases wide ranges of prices were given, and in other cases, no information at all was available; the latter objection especially applies to places and districts other than the metropolitan towns in each State.

In view of the preceding facts, it was decided to initiate an independent investigation and to obtain monthly statements of prices from a number of retail dealers throughout the Commonwealth. In doing so, it was also decided to obtain records of the *predominant* prices, that is to say, the prices of that grade or quality most frequently sold. In this way the difficulty of having, when obtaining prices, to select any particular grade or quality as representative of the purchases or requirements of the mass of the community, is obviated. Moreover, by adopting this method, the fact that the grades or qualities most frequently sold differ either in different localities or even at different periods, practically does not adversely affect the validity of the results obtained. This view of the matter has already been referred to (see p. 16).

**5. Sources of Information as to Retail Prices.**—Having decided upon the nature and scope of the data to be collected, the next step was to obtain the names and addresses of a number of representative retail dealers in each locality for which the particulars were required. This information was obtained, by the courtesy of the Secretary to the Postmaster-General's Department, through the postmaster in each locality. These officers were requested to furnish the names and addresses of a specified number of representative persons in each of the following classes, viz., (a) Grocers, (b) Butchers, and (c) Milk Vendors, and, it was pointed out, in selecting representative persons it was desired to obtain returns of prices only from firms or persons whose shops were patronised to a considerable extent by families of wage-earners; that the shops should not be such as cater chiefly for trade with a special class; and, lastly, that the more substantial establishments should be selected rather than small shops with their trade confined to a restricted locality.

(i.) *Returns for Current Years.*—As a result of the above inquiry satisfactory lists of representative dealers were secured for each town shewn in the following statement. The numbers in the last column but one indicate the number of returns which are collected for each town in the respective horizontal line and for each of the three classes of dealers (grocers, butchers, and milk-vendors). The numbers in the last column shew the total number of monthly returns collected for the six towns specified in each line respectively; the total number of monthly returns may accordingly be seen to be 612, that is, 204 in each class, or 102 in each State.

**Cost of Living, Towns for which Returns Collected, and Number of Returns.**

| N.S.W. | Victoria. | Q'land. | S. Aust. | W. Aust. | Tasmania. | Number of Returns in each Class for each Town | Total Number of monthly Returns. |
|---|---|---|---|---|---|---|---|
| Sydney .. | Melbourne | Brisbane | Adelaide | Perth† | Hobart | 10 | 180 |
| Newcastle | Ballarat | Toowoomba | Kadina* | Kalgoorlie‡ | Launceston | 7 | 126 |
| Broken Hill | Bendigo | Rockhampton | Port Pirie | Midland Junction§ | Zeehan | 7 | 126 |
| Goulburn | Geelong | Charters Towers | Mount Gambier | Bunbury | Beaconsfield | 5 | 90 |
| Bathurst | Warrnambool | Warwick | Petersburg | Geraldton | Queenstown | 5 | 90 |

* Including Moonta and Wallaroo. † Including Fremantle. ‡ Including Boulder City. § Including Guildford.

The forms necessary for the collection of the requisite data were prescribed by Regulation* under the provisions of the Census and Statistics Act, 1905, and were distributed to the various dealers in book form. Each book contained (a) Instructions for filling in the forms, (b) A form for each month of the year 1912, (c) A butt in which the prices entered on the form could be recorded by the person rendering the return, and (d) A supply of addressed post-free envelopes

* See Statutory Rules, 1912, No. 116, and Appendix VII. hereof.

for returning each month to the Commonwealth Statistician the completed forms. Copies of the forms used may be found in Appendix VII. hereof.

In the instructions issued with the forms it was pointed out that prices were to be quoted for the grade or quality most frequently sold to the mass of the community. Thus, if four different qualities of tea were sold, say, at 1s., 1s. 3d., 1s. 6d., and 1s. 9d. per lb., but most was sold at 1s. 3d., then that was the price to enter on the return. It may here be remarked that in order to get a true (weighted) average price, it would be necessary for each dealer furnishing returns to keep a record of the quantity of each commodity sold at each price; this information cannot, of course, in the vast majority of cases be obtained with anything like accuracy. The predominant, or most frequent price, is what is statistically known as the "mode."

The collection of these monthly returns was commenced in January, 1912, and it is intended to furnish index-numbers based thereon for each quarter after the issue of this Report. These index-numbers will, of course, be immediately comparable with those furnished herein.

As regards the collection of prices of bread, it may be stated that returns for the metropolitan (and a few other) towns are received each month from the Agents of the Labour and Industrial Branch of this Bureau. This was found to be necessary since grocers in those towns do not, as in most country towns, ordinarily sell bread.

(ii.) *Returns for Past Years, 1901 to 1911.*—The statistical organisation for the collection of current returns having been completed, attention was given to the question of procuring comparable information for past years. This was effected by obtaining special statements from a few representative firms and persons selected from among those who were already rendering the ordinary monthly returns—remuneration being offered in each case for this service.

In view of the expense entailed and of the difficulty experienced in getting thoroughly reliable information, this special investigation was limited to the capital town in each State. The information furnished gave the price of each commodity at the middle of each of the months of February, May, July, and October, for the years 1901 to 1911, inclusive. The arithmetic averages of the prices thus obtained were computed. In this connection reference may be made to the danger of taking, as has frequently been done, the prices merely at one particular point of time in each year, instead of taking an average. Thus it was found that evidence given by the manager of a large retail grocery business in Melbourne in August, 1912, in a case (under the Commonwealth Conciliation and Arbitration Acts) in which the question as to increase in cost of living was at issue, shewed that, by taking prices simply on the 1st July of each year, in the case of some commodities there had been a rise in price, and in others a fall, whereas according to average prices for the same years computed in this Bureau from periodic returns furnished by the same firm, in some instances an exactly opposite result was obtained.

In order to bring the results for past years (for which, as has already been pointed out, statements were obtained only from some of the persons rendering monthly returns) into line with those for the current and future years, average prices were first computed for each

year and each metropolitan town. Corresponding averages were then computed for the first three months of the current year (1912), firstly, from the monthly returns of those particular persons rendering the statements for past years also, and secondly, for *all* persons rendering current returns. The ratios between these two sets of averages were then computed for each commodity and each town, and new averages were re-computed for past years by multiplying the original averages by their corresponding ratios. The results for past years are thus fully comparable with current figures, provided that the proportional variations in prices obtained from the past year's statements for *some,* only, of the persons rendering current returns are representative of the variations in prices charged by *all* persons furnishing returns.

**6. Sources of Information as to House Rents.**—As regards House Rents, the same procedure for obtaining returns was followed as in the case of prices. Lists of names and addresses of representative agents were furnished by the Town Clerks of the various local Government bodies in the towns specified on page 24 hereinbefore. In regard to the metropolitan towns especially, care was taken to select agents in corresponding and representative suburbs and districts.

(i.) *Current Returns.*—The forms necessary for the collection of the requisite data were prescribed by Regulation* under the Census and Statistics Act, 1905, and were distributed to the house-agents in book form, as in the case of retail prices (see p. 24). Each book contained a form for each quarter of the year,† and in the instructions it was pointed out that particulars were to be given as to predominant weekly rents, that is, the rents most frequently paid for ordinary houses in a fair situation and in a good state of repair. The rents specified do not, therefore, refer to houses in particularly favoured situations, or to new houses having special conveniences or gardens or exceptionally well constructed, nor yet, on the other hand, to old or dilapidated houses, nor to houses in inconvenient or undesirable situations.

(ii.) *Returns for Past Years, 1901 to 1912.*—The arrangements made for the collection of information for past years were the same as in the case of retail prices (see p. 25. Particulars of rents were, however, asked only as at the middle of each year from 1901 to 1911, inclusive. No remuneration was paid for these statements, and the thanks of this Bureau, and of all interested in the question, are due to those agents who were good enough to furnish the information. As in the case of retail prices, the inquiry concerning rents for past years was restricted to the metropolitan towns. Re-computed averages for each year were obtained in the manner already indicated in regard to retail prices.

**7. Cost of Living, General Results of Investigation in each Metropolitan Town, 1901 to 1912.**—Index-numbers have been computed separately for each group of commodities (and for house-rent) included in the investigation, as well as for all groups taken together. These index-numbers are shewn for the capital town of each State in the

---

* See Statutory Rules, 1912, No. 184, and Appendix VII. hereof.

† The danger in obtaining merely one return referring to one particular point of time in the year has already been alluded to.

tables given hereinafter. In addition a weighted average index-number for all the capital towns combined has been computed by weighting the index-number for each town by a number representing its population. In each case the index-numbers have been computed with expenditure according to average prices in the year 1911 as base, that is to say, the figures shew the number of units which would have had to be expended, according to the average prices prevailing in each specified year, in order to purchase such commodities, or to pay such amounts for rent, as would, according to the average prices in 1911, have cost 1000 units.

It should be observed that these index-numbers do not in any way shew the relative purchasing power of money or cost of living in the several places specified; they merely shew the relative cost from year to year in each town independently. In other words, comparisons can be made between the numbers in the *horizontal lines,* but cannot be made *directly* between those in the *vertical columns.* That they are not directly comparable vertically is immediately evident when it is remembered that the expenditure in each town in 1911 (and the weighted average expenditure for all towns) is represented by the one figure—1,000—though actually the expenditure is not, of course, the same in each town. The question of the relative cost in different towns in the Commonwealth is dealt with hereinafter.

Index-numbers for the three main groups and for rent and for all groups and rent together are given separately in the following paragraphs.

(i.) *Groceries.*—In this group the 18 commodities specified on page 20 are included. The index-numbers are shewn in the following table, computed with expenditure in 1911 as base. It has already been pointed out that these index-numbers are *reversible.* That is to say, if it be desired to take any other year as base, the necessary calculations can readily be made by making the index-number for the base-year equal to 1000, and altering the other index-numbers proportionately (see pargaraph (viii.) hereof).

**Retail Prices in Metropolitan Towns, Index-Numbers for Groceries (Group I.), 1901 to 1912.**

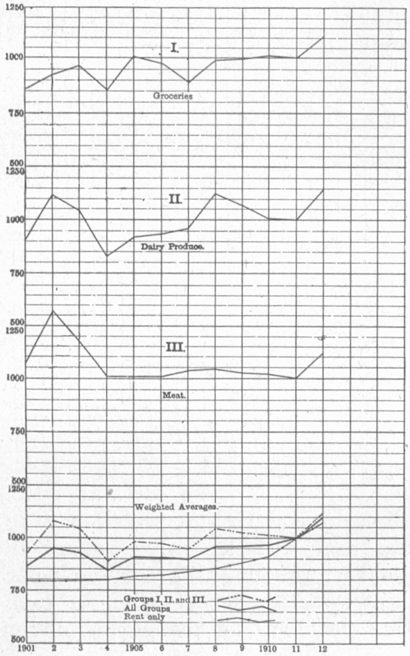
| TOWN. | 1901. | 1902. | 1903. | 1904. | 1905. | 1906. | 1907. | 1908. | 1909. | 1910. | 1911. | 1912.* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sydney | 861 | 923 | 965 | 854 | 1,004 | 978 | 888 | 991 | 996 | 1,010 | **1,000** | 1,107 |
| Melbourne | 970 | 956 | 968 | 892 | 987 | 977 | 884 | 998 | 969 | 1,016 | **1,000** | 1,125 |
| Brisbane | 930 | 924 | 867 | 821 | 914 | 917 | 891 | 961 | 955 | 970 | **1,000** | 1,080 |
| Adelaide | 990 | 995 | 956 | 928 | 1,012 | 997 | 943 | 985 | 1,035 | 1,015 | **1,000** | 1,161 |
| Perth | 789 | 856 | 873 | 829 | 866 | 847 | 794 | 826 | 810 | 859 | **1,000** | 931 |
| Hobart | 932 | 939 | 958 | 881 | 944 | 985 | 886 | 958 | 1,016 | 1,009 | **1,000** | 1,128 |
| Weighted Average† | 916 | 939 | 951 | 872 | 981 | 966 | 887 | 979 | 976 | 1,000 | **1,000** | 1,106 |

* The first nine months only. † For the six capital towns.

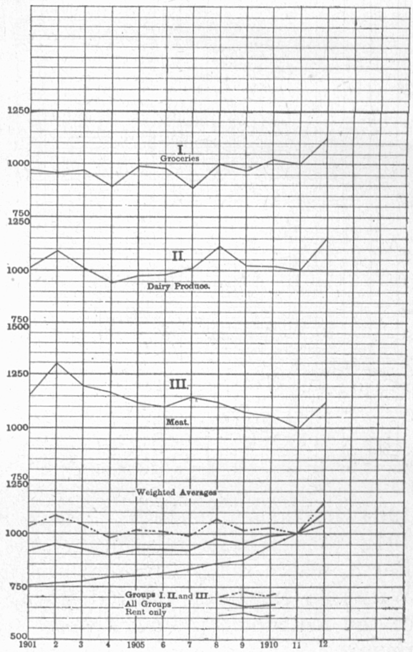
The above figures are shewn on the graphs on pages 28 and 29 the first graph (marked I.) in each case representing the index-numbers for this group. It may be seen that, while the graph for Perth shews certain distinctive features, there is a marked similarity between all the graphs for the different towns, prices being low in

RETAIL PRICES, HOUSE RENT, AND COST OF LIVING IN METROPOLITAN TOWNS.
GRAPHS, 1901 TO 1912.

SYDNEY.

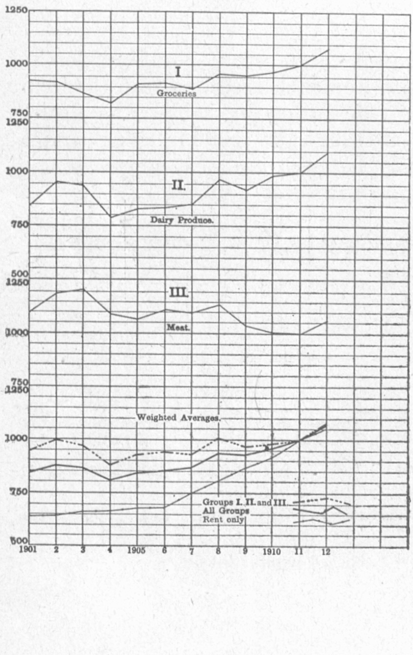



MELBOURNE.

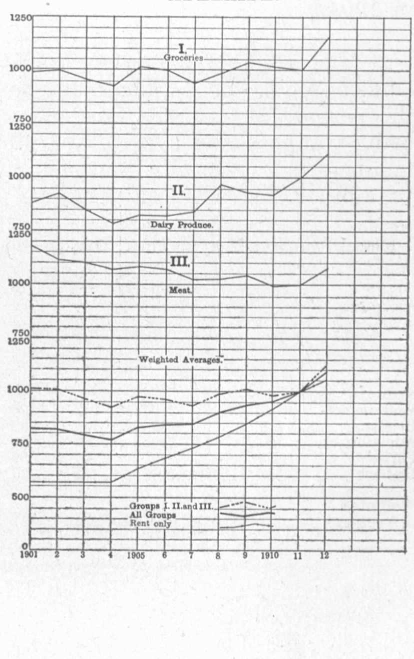



RETAIL PRICES, HOUSE RENT, AND COST OF LIVING IN METROPOLITAN TOWNS
GRAPHS, 1901 TO 1912.

BRISBANE.

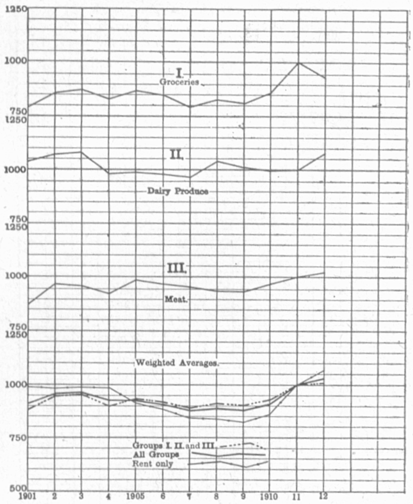



ADELAIDE.

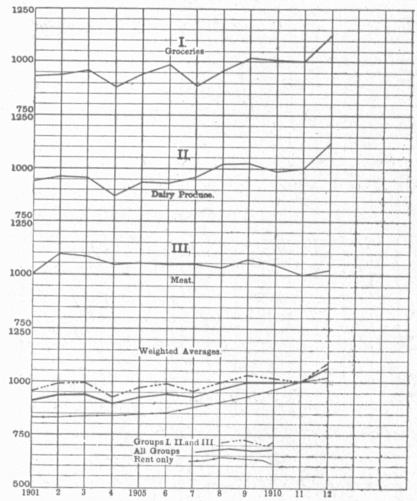


RETAIL PRICES, HOUSE RENT, AND COST OF LIVING IN METROPOLITAN TOWNS, GRAPHS, 1901 TO 1912.

PERTH AND FREMANTLE.




HOBART.




1904 and again in 1907. There is a rapid rise in the price-levels in 1912 (the figures relating to the first nine months only) except in Perth, where the prices had been unusually high in the preceding year. With the exception of that town, prices were higher in 1912 in each of the metropolitan towns than in other year during the period under review.

In Sydney, Brisbane, Adelaide, and Hobart, prices were lowest in 1904, but in Melbourne they were somewhat lower in 1907, and in Perth they were lower in each of the years 1907, 1908, and 1909, than in 1904.

(ii.) *Dairy Produce.*—In this group there are 7 commodities included (see p. 20 ). The index-numbers for each metropolitan town for the period 1901 to 1912 are shewn in the following table, the figures being computed with prices in 1911 as base (= 1000). The index-numbers are *reversible,* and may readily be computed for prices in any year other than 1911 as base (see paragraph (viii.) hereof).

**Retail Prices in Metropolitan Towns, Index-Numbers for Dairy Produce (Group II.), 1901 to 1912.***

| TOWN. | 1901. | 1902. | 1903. | 1904. | 1905. | 1906. | 1907. | 1908. | 1909. | 1910. | 1911. | 1912.* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sydney .. | 907 | 1,117 | 1,043 | 828 | 922 | 938 | 60 | 1,125 | 1,069 | 1,005 | **1,000** | 1,149 |
| Melbourne | 1,011 | 1,092 | 1,010 | 945 | 976 | 980 | 1,008 | 1,112 | 1,031 | 1,017 | **1,000** | 1,152 |
| Brisbane .. | 848 | 957 | 941 | 787 | 832 | 837 | 852 | 969 | 922 | 989 | **1,000** | 1,096 |
| Adelaide .. | 884 | 930 | 850 | 784 | 824 | 821 | 842 | 969 | 932 | 922 | **1,000** | 1,113 |
| Perth .. | 1,039 | 1,070 | 1,077 | 981 | 989 | 980 | 966 | 1,038 | 1,008 | 997 | **1,000** | 1,077 |
| Hobart .. | 937 | 963 | 959 | 869 | 933 | 931 | 961 | 1,021 | 1,023 | 988 | **1,000** | 1,121 |
| Weighted Average† | 945 | 1,068 | 1,002 | 871 | 927 | 934 | 955 | 1,082 | 1,023 | 998 | **1,000** | 1,136 |

* For first nine months only. † For all capital towns.

These figures are shown separately for each town on the second set of graphs (marked II.) on pages 28 and 29. It may again be observed that there is great similarity in the general contour of the graphs. Prices are high in 1902, 1908, and 1912, and in each town the maximum during the period under review was reached in the last year. These years of high prices coincide with the drought years, and it should be noticed that the increases are relatively larger in Sydney than in Melbourne, and in Melbourne than the other capital towns. In every case prices were lowest in 1904, which was also a year of low prices for groceries and meat. In Perth the maximum price-level in 1912 was equalled in 1903, but in the other towns the level in 1912 was distinctly above that for other years.*

(iii.) *Meat.*—This group includes the prices for 21 different commodities and joints, or cuts of butchers' meat (see p. 20). The index-numbers computed with prices in 1911 as base (= 1000), are shewn in the following table. These numbers are *reversible,* and the results for any other year as base can, therefore, be readily computed (see paragraph (viii.) hereof).

**Retail Prices in Metropolitan Towns, Index Numbers for Meat (Group III.), 1901 to 1912.**

| TOWN. | 1901. | 1902. | 1903. | 1904. | 1905. | 1906. | 1907. | 1908. | 1909. | 1910. | 1911. | 1912.* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sydney .. | 1,070 | 1,320 | 1,173 | 1,007 | 1,007 | 1,007 | 1,037 | 1,043 | 1,024 | 1,019 | **1,000** | 1,116 |
| Melbourne | 1,159 | 1,299 | 1,199 | 1,168 | 1,116 | 1,100 | 1,148 | 1,123 | 1,074 | 1,052 | **1,000** | 1,173 |
| Brisbane .. | 1,098 | 1,190 | 1,209 | 1,089 | 1,064 | 1,111 | 1,096 | 1,136 | 1,035 | 1,002 | **1,000** | 1,060 |
| Adelaide .. | 1,178 | 1,113 | 1,100 | 1,068 | 1,083 | 1,069 | 1,021 | 1,023 | 1,043 | 995 | **1,000** | 1,079 |
| Perth .. | 874 | 970 | 962 | 929 | 985 | 970 | 958 | 939 | 938 | 973 | **1,000** | 1,062 |
| Hobart .. | 1,003 | 1,094 | 1,083 | 1,044 | 1,050 | 1,046 | 1,047 | 1,033 | 1,067 | 1,045 | **1,000** | 1,021 |
| Weighted Average† | 1,101 | 1,251 | 1,161 | 1,072 | 1,058 | 1,053 | 1,074 | 1,069 | 1,040 | 1,024 | **1,000** | 1,121 |

* For first nine months only. † For all capital towns.

The price-indexes for this group, shewn in the third set of graphs (marked III.) on pages 28 and 29 present a very different aspect from those already referred to for Groups I. and II. Except for the increase in all the towns in 1912,* and in some of the towns in 1902, there is not any marked similarity between the price movements in most of the capital towns. Nor does it appear, as in the case of the other groups, that there has been any general increase (except in 1912) over the whole period under review. The rise in prices in 1902 and 1912 is, no doubt, due to the effects of the droughts in these years, and the drought-year of 1908 also shews increased prices in most of the towns.

In Sydney, the most noticeable features are the increases in price in 1902 and 1912, from 1904 to 1911 prices remaining fairly level. The maximum level was reached in 1902, and the minimum in 1911. The graphs for Melbourne and Brisbane prices are, in some respects, very similar to that for Sydney, the minimum prices occurring in the

* This may, of course, to some extent be due to the fact that the prices refer only to the first nine months of the year 1912, and the average therefore includes six winter months, when prices of commodities in this group may be said to be relatively high, and only three summer months, when prices are relatively low.

same year (1911) in all three towns, the maximum for Melbourne being in 1902, and for Brisbane in 1903. In Melbourne, the years intervening between the maximum and minimum shew a general fall, with a temporary increase in 1907, while in Brisbane there are increases both in 1906 and 1908.

In Adelaide prices shew a general fall from 1901 to 1911, the maximum level occurring in the former year, and the minimum in the latter. In Perth, on the contrary, the graph for this group on page 29 shews a general upward tendency over the period, though prices fell in the years 1902-4 and 1905-9. Conditions governing the meat supply in Western Australia are presumably different from those in the Eastern States. In Hobart, except for the rise in 1902, prices have been fairly level during the period under review.

(iv.) *Groceries and Food, Combined.*—The results obtained from the three groups referred to above have been combined so as to shew a weighted average for groceries and food. These results are of importance as shewing the aggregate effect on the cost of living of the movements in prices of commodities apart from variations in house rent. The index-numbers thus computed for the three groups are shewn in the following table. Since they are reversible, the necessary calculations for any other year as base can readily be made (see paragraph (viii.) hereof).

**Retail Prices in Metropolitan Towns, Index-Numbers for Groceries and Food (Groups I., II. and III.), 1901 to 1912.***

| TOWN. | 1901. | 1902. | 1903. | 1904. | 1905. | 1906. | 1907. | 1908. | 1909. | 1910. | 1911. | 1912.* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sydney .. | 927 | 1,078 | 1,040 | 886 | 982 | 974 | 946 | 1,041 | 1,023 | 1,011 | **1,000** | 1,119 |
| Melbourne | 1,032 | 1,085 | 1,041 | 980 | 1,018 | 1,010 | 989 | 1,064 | 1,015 | 1,026 | **1,000** | 1,145 |
| Brisbane .. | 948 | 998 | 970 | 877 | 928 | 943 | 930 | 1,006 | 966 | 983 | **1,000** | 1,080 |
| Adelaide .. | 1,008 | 1,007 | 963 | 922 | 974 | 963 | 933 | 990 | 1,006 | 981 | **1,000** | 1,124 |
| Perth .. | 880 | 946 | 953 | 899 | 935 | 919 | 890 | 911 | 901 | 930 | **1,000** | 1,009 |
| Hobart .. | 955 | 992 | 996 | 927 | 973 | 990 | 955 | 997 | 1,033 | 1,015 | **1,000** | 1,093 |
| Weighted Average† | 972 | 1,056 | 1,019 | 924 | 986 | 980 | 955 | 1,031 | 1,006 | 1,005 | **1,000** | 1,118 |

* For first nine months only. † For all capital towns.

The price-indexes for groceries and food are shewn by the broken lines on the graphs on pages 28 and 29 in relation to the price-indexes for house-rent alone, and to the weighted averages for all groups. It may be seen that there is again considerable similarity between the graphs for Sydney, Melbourne, and Brisbane, the price-level being high in 1902, 1908, and 1912, and low in 1904. The fluctuations are more marked in Sydney than in either of the other two towns. In all the capital towns prices for groceries and food reached their maximum in 1912,* and, reviewing the whole of the period, it may be seen that, broadly speaking, prices have tended to move upward. This upward tendency is most marked in Perth, Adelaide, and Brisbane, and is least noticeable in Melbourne.

The general trend of prices may perhaps be more clearly seen by considering the average price-level in 1911 and 1912 in relation, firstly,

* See footnote * on page 30.

to the average level during the five years 1901 to 1905, and secondly, to the average level in 1905 to 1910. Figures shewing such comparisons may be found in paragraph (vii.) hereinafter, both for the groups under consideration, for house-rents, and for all groups together.

(v.) *House Rent.*—In the following table index-numbers have been computed for the weighted average house-rent in each of the capital towns from 1901 to 1912, taking the average rent in 1911 as the base (= 1000). The average rent has been obtained for each town separately by multiplying the average predominant rent for each class of house (*i.e.,* houses having less than 4 rooms, 4 rooms, 5 rooms, 6 rooms, 7 rooms, and over 7 rooms) by a number ("weight") representing the relative number of houses of that class in the particular town. The sum of the products thus obtained, divided by the sum of the weights, gives the weighted average for all houses.* The number of houses in each class for each town was obtained from the results of the 1911 Census. It should be observed, therefore, that these index-numbers are based on the weighted average rents for all houses, and that they do not refer to any particular class of houses. The actual predominant rents for each class are given in Appendix IV. hereof, and an examination of these figures will shew that for some classes of houses the increase has been greater, and in some less, than the general increase indicated in the following table.

The index-numbers may readily be computed for any year other than 1911 as base (see paragraph (viii.) hereof).

**House Rents in Metropolitan Towns, Index-Numbers shewing Weighted Average Rents (Group IV.), 1901 to 1912.**

| TOWN. | 1901. | 1902. | 1903. | 1904. | 1905. | 1906. | 1907. | 1908. | 1909. | 1910. | 1911. | 1912.* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sydney .. | 792 | 792 | 794 | 797 | 818 | 822 | 840 | 851 | 880 | 910 | **1,000** | 1,074 |
| Melbourne | 756 | 767 | 771 | 788 | 795 | 806 | 829 | 854 | 868 | 945 | **1,000** | 1,037 |
| Brisbane .. | 637 | 641 | 660 | 662 | 676 | 683 | 750 | 803 | 862 | 912 | **1,000** | 1,051 |
| Adelaide .. | 566 | 566 | 566 | 566 | 631 | 684 | 730 | 784 | 845 | 916 | **1,000** | 1,051 |
| Perth .. | 988 | 982 | 989 | 985 | 912 | 883 | 844 | 837 | 823 | 859 | **1,000** | 1,070 |
| Hobart .. | 829 | 831 | 836 | 838 | 846 | 852 | 880 | 904 | 931 | 964 | **1,000** | 1,023 |
| Weighted Average† | 755 | 759 | 763 | 770 | 784 | 794 | 818 | 841 | 868 | 921 | **1,000** | 1,055 |

* For first nine months only. † For all capital towns.

The above figures are shewn on the graphs on pages 28 and 29, in relation to the combined price-indexes for the other groups and for all groups together. It may be seen that, except in Adelaide, where rents remained constant from 1901 to 1903, and in Perth, where they decreased from 1903 to 1907, and again in 1909, there has been a uniform increase in each metropolitan town during the whole of the period under review. The increase has been greater in Adelaide (where the average rent in 1901 was only 566 compared with 1000 in 1911, and 1051 in

* The process may be illustrated mathematically as follows :—If $a_1$, $a_2$, $a_3$. . . . etc., be the average predominant rents in any town for houses of under 4 rooms, 4 rooms, 5 rooms, etc., . . . respectively, and if $n_1$ , $n_2$ , $n_3$ . . . ete. be the corresponding numbers of houses of each such class in that town, then the weighted average rent $= \frac{n_1a_1 + n_2a_2 , + n_3a_3 + \ldots}{n_1 + n_2 + n_3 + \ldots} = \frac{\Sigma\ (na)}{N}$ where $N$ = the total number of houses in the town.

1912), and in Brisbane than in the other towns. It should be observed, however, that at the commencement of the period rents were exceptionally low in Adelaide, and were comparatively low in Brisbane (see Appendix IV. hereof). The graph for Perth presents features entirely different from those for the other towns; the fall in rents commencing in 1903, and lasting until 1907, is followed, after another temporary decline in 1909, by a rapid rise.

The general results of these index-numbers can perhaps be better appreciated by a comparison of the average rents in the years 1911 and 1912, compared with the average rents during the two preceding quinquennial periods. These comparisons are shewn in paragraph (viii.) hereof.

(vi.) *Weighted Average for All Groups.*—The weighted averages for all four groups are of importance as indicating the general results of this investigation so far as cost of living is concerned. The following table shews the index-numbers for groceries, food, and house-rent for each metropolitan town computed to the year 1911 as base (= 1000). As already pointed out, these index-numbers are *reversible,* and if it be desired to take any other year as base, the necessary arithmetical work can readily be done (see paragraph (viii.) hereof).

**Cost of Living in Metropolitan Towns, Index-Numbers shewing Weighted Average Results for all Groups (Groceries, Dairy Produce, Meat, and House Rent), 1901 to 1912.**

| TOWN. | 1901. | 1902. | 1903. | 1904. | 1905. | 1906. | 1907. | 1908. | 1909. | 1910. | 1911. | 1912.* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sydney | 866 | 950 | 929 | 846 | 909 | 906 | 898 | 956 | 959 | 965 | **1,000** | 1,099 |
| Melbourne | 916 | 951 | 927 | 899 | 924 | 924 | 922 | 976 | 953 | 992 | **1,000** | 1,100 |
| Brisbane .. | 841 | 875 | 863 | 803 | 841 | 853 | 868 | 936 | 930 | 959 | **1,000** | 1,070 |
| Adelaide .. | 817 | 816 | 791 | 768 | 826 | 843 | 845 | 901 | 936 | 953 | **1,000** | 1,093 |
| Perth .. | 912 | 957 | 964 | 925 | 928 | 909 | 876 | 889 | 878 | 909 | **1,000** | 1,027 |
| Hobart .. | 911 | 937 | 941 | 897 | 929 | 942 | 929 | 965 | 998 | 997 | **1,000** | 1,069 |
| Weighted Average† | 880 | 929 | 910 | 858 | 901 | 902 | 897 | 951 | 948 | 970 | **1,000** | 1,091 |

* For first nine months only. † For all capital towns.

These figures are shewn separately for each town by the heavy line in the graphs on pages 28 and 29, in comparision with graphs shewing index-number for groceries and food and for house-rents. In all the towns the graphs disclose a distinct upward movement during the period under review, the rise in 1912* being particularly marked.

Generally speaking, prices were low in 1904, high in 1902 and 1908, and still higher in 1912. The general trend of the graph for Perth is different to that for the other towns, owing mainly to the decline in house-rents in that place which occurred from 1903 to 1907, and again in 1909.

(vii.) *Relative Cost of Living at Different Periods, 1901 to 1912.*—Owing to the saltatory nature of the index-numbers, it is somewhat difficult, merely from the tables and graphs of annual index-numbers which have been given, to gauge the effect of the variations in the index-numbers on the cost of living over periods of several years.

* See footnote * on page 30.

In order to illustrate the method which may be employed for comparisons of this character, the average index-numbers during each of the quinquennial periods 1901-5 and 1906-10 have been computed, and the average index-number for 1911 and 1912 (first nine months only) compared with the average for each preceding quinquennium.

In the following table index-numbers for the average prices in 1911 and 1912 are shewn, firstly, computed with the average prices in 1901-5 as base (= 1000), and secondly, with the average prices in 1906-10 as base (= 1000). In other words, the first part of the table shews the number of units which would have had to be expended, according to the average prices prevailing in 1911 and 1912, in order to purchase such commodities, and to pay such amounts for rent as would, according to the average prices in 1901-5, have cost 1000 units.

Similarly, the second part of the table shews the cost in 1911-12 of what would, in 1906-10, have cost 1000 units.

**Cost of Living in Metropolitan Towns, 1901 to 1912, Index-Numbers shewing Average Cost in 1911 and 1912, compared with Average Cost in each preceding Quinquennium respectively.**

| Particulars. | Base Period. | Sydney. | Melbourne | Brisbane. | Adelaide. | Perth. | Hobart. |
|---|---|---|---|---|---|---|---|
| PRICE-INDEXES FOR 1911–12, THE AVERAGE EXPENDITURE IN 1901–5 BEING TAKEN AS 1,000 IN EACH GROUP OR SERIES OF GROUPS. | | | | | | | |
| **Groceries and Food** (Groups I., II., III.) | = 1,000 for 1901-5 | 1,077 | 1,040 | 1,102 | 1,089 | 1,088 | 1,079 |
| **House Rent**— (Group IV.) .. | = 1,000 for 1901-5 | 1,298 | 1,314 | 1,565 | 1,770 | 1,066 | 1,209 |
| **Weighted Average for All Groups** .. | = 1,000 for 1901-5 | 1,166 | 1,138 | 1,225 | 1,301 | 1,081 | 1,126 |
| PRICE-INDEXES FOR 1911–12, THE AVERAGE EXPENDITURE IN 1906–10 BEING TAKEN AS 1,000 IN EACH GROUP OR SERIES OF GROUPS. | | | | | | | |
| **Groceries and Food** (Groups I., II., III.) | = 1,000 for 1906-10 | 1,060 | 1,050 | 1,077 | 1,089 | 1,103 | 1,048 |
| **House Rents**— (Group IV.) .. | = 1,000 for 1906-10 | 1,204 | 1,184 | 1,278 | 1,294 | 1,219 | 1,116 |
| **Weighted Average for All Groups** .. | = 1,000 for 1906-10 | 1,120 | 1,102 | 1,139 | 1,167 | 1,136 | 1,076 |

In every case these numbers are greater than the base number (1000), representing the average cost during each preceding quinquennium respectively, and the cost of living in each group was accordingly greater in 1911-12 than in either 1901-5 or 1906-10. For example, in Sydney the average cost of groceries and food in 1911-12 was 1077, compared with 1000 in 1901-5, that is, an increase of 77, or 7.7 per cent. Similarly for house-rent the increase in 1911-12 over 1901-5 was 29.8 per cent., and for all groups was 16.6 per cent.

The greatest increase shewn by the above figures is in house rents in Adelaide, comparing 1911-12 with 1901-5, namely 77 per cent. As might be expected from the graphs the increases in 1911-12 over 1906-10 are not ordinarily as great as over the preceding quinquennium, though in Perth the reverse is the case. Thus for all groups together

the increase in 1911-12 over 1901-5 in Sydney is 16.6 per cent., Melbourne 13.8 per cent., Brisbane 22.5 per cent., compared with increases over 1906-10 of 12.0 per cent., 10.2 per cent., and 13.9 per cent. respectively.

(viii.) *Reversibility of Index-Numbers.*—Attention has already been drawn to the fact (see page 14) that index-numbers computed by the aggregate expenditure method adopted in this Report are *really reversible,* so that, if it be desired to ascertain the price-indexes with any year other than that shewn in the tables herein as base, the necessary arithmetical work can readily be performed.

For example, turning to the table on page 27 shewing index-numbers for groceries, if it be desired to ascertain the index-number for Sydney with the year 1901 as base (1901 expenditure = 1000), the index-number for 1901 will, of course, be 1000 instead of 861, that for 1902 will be $^{923}/_{861} \times 1000 = 1072$, for 1903 will be $^{965}/_{861} \times 1000 = 1121$, for 1911 it will be $^{1000}/_{861} \times 1000 = 1161$, and so on.

Similarly in regard to all other index-numbers given in this part of the Report *the figures may readily be reversed* so as to shew the relative expenditure with any desired year as base.

8.—**General Results of Investigation, Relative Cost of Living in Different Towns, 1912.**—The index-numbers given in the preceding ing paragraphs shew the cost of living separately for each individual town during the years 1901 to 1912. The figures given in the table on page 37 shew the relative cost of living (based on the average prices for the first nine months of the year 1912) in the thirty towns for which particulars are now being collected. The cost of living in each town is compared with the weighted average for all towns. That is to say, the average expenditure in each group in each town has been weighted by a number representing the population of the town and a weighted average expenditure for all towns has been computed.* Taking this average expenditure as the base (= 1000) the relative expenditure in each town has been computed. Owing to the concentration of population in the capital towns the prices and rents in these towns have a preponderating influence on the weighted average index-numbers for all towns combined.

---

* The population weights used in this computation are as follow:—

**Population Weights used in Computation of Index-Numbers shewing Cost of Living in different Towns, with weighted average for all Towns as Base (= 1000).**

| Town. | Weight. | Town. | Weight. | Town. | Weight. | Town. | Weight. | Town. | Weight. | Towu. | Weight. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Sydney .. | 633 | Melbourne | 590 | Brisbane | 140 | Adelaide | 190 | Perth, etc. | 105 | Hobart | 42 |
| Newcastle | 62 | Ballarat | 53 | T'woomba | 20 | Kadina, etc | 12 | Kalg'lie,etc | 31 | Launceston | 25 |
| Br'ken Hill | 31 | Bendigo | 44 | R'k'hmton | 21 | Pt. Pirie | 11 | Mid. Jncn. | 7 | Q'nstown | 5 |
| Goulburn | 13 | Geelong | 34 | Chtrs Twrs | 17 | Mt. Gam'br | 7 | Bunbury | 4 | Zeehan | 4 |
| Bathurst | 9 | W'nambo'l | 9 | Warwick | 6 | Petersburg | 3 | Geraldton | 4 | Beacnsfield | 3 |

It is proper to observe that these index-numbers are also *reversible,* that is to say, if it be desired to take the expenditure in any particular town as base, the necessary calculations can readily be made. For example, referring to the index-numbers for all groups, taking expenditure in Melbourne as the base (= 1000 instead of 968), the relative cost in Sydney is—

$$\frac{1078}{968} \times 1000 = 1114; \text{ in Brisbane } \frac{907}{968} \times 1000 = 937; \text{ and so on.}$$

In other words, cost of living is 11.4 per cent. more in Sydney, and 6.3 per cent. less in Brisbane than in Melbourne.

Comparing the last three columns it may be seen that the relative costs in the different towns in regard to the two main divisions, and the weighted average for all groups combined, differ considerably. Thus, in Sydney the index-number for rent is 1232, or 23.2 per cent. above the weighted average for all towns, whereas the index-number for groceries and food is 981, or 1.9 per cent. below the average. In Brisbane, on the other hand, the index-number for groceries and food is greater than that for house-rent, both numbers being below the weighted average. In some of the smaller towns, too, especially in the mining districts, it may be seen that rents are very low, and groceries high, compared with the weighted average.

(i.) *House Rent.*—The index-numbers in the fourth column show that the most expensive town for house rent is Sydney, followed in the order named by Adelaide, Geraldton (W.A.), Melbourne, Goulburn, Geelong and Perth. Rents were cheapest in Beaconsfield and Zeehan.

(ii.) *Groceries and Food.*—As regards groceries and food, it may be seen that the most expensive towns are in Western Australia, where prices in Kalgoorlie and Boulder are highest. In the other States Broken Hill is the most expensive, followed in the order named by Charters Towers, Zeehan, Queenstown, Port Pirie, Beaconsfield and Hobart. Prices were lowest in Mount Gambier and Warrnambool.

(iii.) *All Groups.*—The last column shews that in regard to cost of living generally (according to the prices and house rents prevailing in the first nine months of the year 1912) the most expensive towns were Kalgoorlie and Boulder, where the cost was 24.5 per cent. above the weighted average. The next towns in point of expense were Geraldton (W.A.), Sydney, Perth and Fremantle, Adelaide, Midland Junction, Bunbury, Broken Hill and Melbourne. The least expensive towns were Beaconsfield, Ballarat, Bathurst, Kadina Moonta and Wallaroo, and Bendigo, in the order named.

As regards the capital towns, it may be seen that Sydney was the most expensive, followed in the order named by Perth and Adelaide (equal), Melbourne and Hobart, Brisbane being the cheapest.

**Cost of Living, 1912.* Index-Numbers shewing Cost in each of Thirty different Towns (including the Average Rent for All Houses) compared with Weighted Average Cost for All Towns.†**

| TOWNS. | I. Groceries. | II. Dairy Produce. | III. Meat. | IV. Rent. | I., II., III. Groceries and Food. | All Groups.‡ |
|---|---|---|---|---|---|---|
| **New South Wales—** | | | | | | |
| Sydney .. | 1,009 | 980 | 936 | 1,232 | 981 | 1,078 |
| Newcastle .. | 1,028 | 946 | 976 | 678 | 991 | 871 |
| Broken Hill .. | 1,145 | 1,192 | 1,230 | 658 | 1,181 | 980 |
| Goulburn .. | 1,013 | 972 | 841 | 905 | 955 | 936 |
| Bathurst .. | 1,021 | 943 | 806 | 668 | 941 | 836 |
| **Victoria—** | | | | | | |
| Melbourne .. | 930 | 976 | 954 | 997 | 950 | 968 |
| Ballarat .. | 902 | 864 | 1,135 | 645 | 954 | 835 |
| Bendigo .. | 971 | 937 | 996 | 649 | 968 | 846 |
| Geelong .. | 941 | 920 | 969 | 860 | 942 | 911 |
| Warrnambool | 933 | 893 | 947 | 763 | 925 | 863 |
| **Queensland—** | | | | | | |
| Brisbane .. | 1,052 | 951 | 867 | 799 | 974 | 907 |
| Toowoomba .. | 1,121 | 909 | 803 | 806 | 976 | 911 |
| Rockhampton | 1,082 | 948 | 977 | 690 | 1,016 | 891 |
| Charters Towers | 1,314 | 1,043 | 964 | 597 | 1,144 | 934 |
| Warwick .. | 1,138 | 908 | 936 | 818 | 1,019 | 942 |
| **South Australia—** | | | | | | |
| Adelaide .. | 996 | 1,083 | 979 | 1,159 | 1,016 | 1,072 |
| Kadina Moonta Wallaroo .. | 987 | 1,075 | 986 | 567 | 1,012 | 841 |
| Port Pirie .. | 1,033 | 1,091 | 1,047 | 721 | 1,054 | 926 |
| Mt. Gambier .. | 962 | 800 | 911 | 639 | 903 | 801 |
| Petersburg .. | 1,072 | 946 | 1,006 | 798 | 1,019 | 934 |
| **Western Australia—** | | | | | | |
| Perth and Fremantle .. | 1,063 | 1,180 | 1,467 | 859 | 1,204 | 1,072 |
| Kalgoorlie and Boulder .. | 1,406 | 1,438 | 1,703 | 846 | 1,495 | 1,245 |
| Midland Junct'n and Guildford | 1,090 | 1,127 | 1,560 | 737 | 1,226 | 1,038 |
| Bunbury .. | 1,100 | 1,092 | 1,678 | 667 | 1,252 | 1,027 |
| Geraldton .. | 1,181 | 1,186 | 1,414 | 1,069 | 1,245 | 1,177 |
| **Tasmania—** | | | | | | |
| Hobart .. | 1,012 | 984 | 1,091 | 816 | 1,025 | 945 |
| Launceston .. | 949 | 924 | 1,083 | 810 | 978 | 913 |
| Zeehan .. | 1,063 | 1,055 | 1,328 | 448 | 1,132 | 869 |
| Beaconsfield .. | 1,009 | 960 | 1,131 | 294 | 1,028 | 746 |
| Queenstown .. | 1,070 | 1,034 | 1,309 | 583 | 1,124 | 916 |
| **Weighted Average for all Towns** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** |

* For first nine months only. † The weighted average for all towns is found as follows:—Let $E$ denote the group-expenditure in any town and $P$ its population, suffixes being used to relate the two, the weighted average for the whole of the towns is $E = \frac{E_1P_1 + \text{etc.}}{P + \text{etc.}} = \frac{\Sigma(EP)}{\Sigma P}$
‡ Weighted averages.

Some few words as to the proper interpretation of the above table may not be out of place. The weighted average for all towns represents the price paid, on the average, by the people of all the towns regarded as a single community. In other words, if the people of the thirty towns are paying *on the average* £1000 for groceries, the people in Sydney

are paying £1009, those in Newcastle £1028, and so on. (See column I.) Or again, if the people of the thirty towns are paying on the average £1000 for the four series of items, then those of Melbourne are paying £968, of Ballarat £835, and so on. (See final column). Thus in this table the figures are *comparable vertically, but are not directly comparable horizontally,* and this is to be carefully borne in mind in making comparison. That they are not directly comparable horizontally is immediately evident when it is remembered that each series, or group, for all towns is represented by the one figure—1000—though actually they do not represent equal amounts.

It should be clearly understood that, so far as house rent is concerned, the figures given in the preceding table shew the relative cost, including the weighted average for *all* houses in each town. If houses of any particular size only are included, different results may be obtained. This is evident when it is remembered that the distribution of houses according to number of rooms is substantially different in some of the towns; that is to say, there are a greater number of large, and therefore of relatively more expensive houses, in some towns than in others, and *vice versa,* and consequently the weighted average rents in the former class of towns refer to a larger size of house than in the latter class.

Analogous observations apply, perhaps less strongly but none the less truly, to other elements of the table. For example the regimen adopted, though accurately representative of Australia as a whole, no doubt varies from State to State and from town to town, as well as from class to class, and of course finally individually. And price-indexes may, of course, be regarded from this point of view, and will be as numerous as the classifications for which they are deduced. The regimen as regards columns I. to IV. may be taken as generally applicable, and none but general data exist for relative consumption of food and groceries. The census, however, has furnished evidence as regards certain differences obtaining in respect of houses.

The census results shew that as regards number of rooms, houses having four rooms are most numerous, followed by five and six-roomed houses in the order named. It has, therefore, been thought desirable to furnish extended tables shewing relative cost of living in the thirty towns specified for these classes of houses separately.

The following table furnishes index-numbers for house rent of four, five, and six-roomed houses, and also for all groups combined for each class of house separately. The figures shewn in the preceding table in regard to the weighted average for *all* houses are repeated for comparative purposes. These index-numbers have again been computed in the manner already indicated, with the weighted average for the whole thirty towns as base (= 1000).*

* Strictly speaking, in dealing with houses of a special class, the weights should be based upon the relative number of houses of that special class in the several towns, and not upon the relative population of the towns. The difference in using population weights is, however, small and only affects the results in so far as the weighted average for all towns is concerned; in other words the system of weights does not in any way affect the results in so far as relative cost as between town and town is concerned, but merely concerns the relation between the cost in each town, and the weighted average cost for all towns.

**Cost of Living, 1912.* Index-Numbers shewing Relative Cost in each of Thirty Towns (including 4, 5, and 6-roomed Houses and all Houses), compared with Weighted Average Cost for all Towns.**

| Town. | House Rent. | | | | Food, Groceries, and Rent, including Houses having— | | | |
|---|---|---|---|---|---|---|---|---|
| | 4-room'd Houses only. | 5-room'd Houses only. | 6-room'd Houses only. | All Houses Weight'd Average. | 4 Rooms. | 5 Rooms. | 6 Rooms. | All Houses. Weight'd Average. |
| NEW SOUTH WALES— | | | | | | | | |
| Sydney .. .. | 1,265 | 1,208 | 1,187 | 1,232 | 1,072 | 1,065 | 1,067 | 1,078 |
| Newcastle .. .. | 626 | 734 | 755 | 678 | 874 | 896 | 892 | 871 |
| Broken Hill . .. | 808 | 830 | 764 | 658 | 1,062 | 1,051 | 1,007 | 980 |
| Goulburn .. .. | 618 | 847 | 870 | 905 | 848 | 915 | 920 | 936 |
| Bathurst .. .. | 632 | 638 | 663 | 668 | 843 | 829 | 825 | 836 |
| VICTORIA— | | | | | | | | |
| Melbourne .. .. | 977 | 977 | 994 | 997 | 958 | 959 | 968 | 968 |
| Ballarat .. .. | 492 | 553 | 594 | 645 | 806 | 806 | 803 | 835 |
| Bendigo .. .. | 590 | 621 | 649 | 649 | 847 | 840 | 835 | 846 |
| Geelong .. .. | 731 | 779 | 838 | 860 | 875 | 882 | 899 | 911 |
| Warrnambool .. | 717 | 734 | 732 | 763 | 859 | 855 | 845 | 863 |
| QUEENSLAND— | | | | | | | | |
| Brisbane .. .. | 682 | 700 | 759 | 799 | 881 | 873 | 884 | 907 |
| Toowoomba .. .. | 626 | 706 | 686 | 806 | 864 | 876 | 855 | 911 |
| Rockhampton .. | 626 | 610 | 649 | 690 | 891 | 866 | 863 | 891 |
| Charters Towers .. | 611 | 683 | 653 | 597 | 974 | 974 | 939 | 934 |
| Warwick .. .. | 752 | 739 | 732 | 818 | 934 | 916 | 899 | 942 |
| SOUTH AUSTRALIA— | | | | | | | | |
| Adelaide .. .. | 1,188 | 1,264 | 1.224 | 1,159 | 1,071 | 1,108 | 1,103 | 1,072 |
| Moonta, &c. .. .. | 590 | 576 | 617 | 567 | 877 | 851 | 847 | 841 |
| Port Pirie .. .. | 843 | 796 | 755 | 721 | 978 | 958 | 929 | 926 |
| Mt. Gambier.. .. | 604 | 632 | 635 | 639 | 807 | 803 | 791 | 801 |
| Petersburg .. .. | 843 | 847 | 828 | 798 | 963 | 955 | 939 | 934 |
| WEST AUSTRALIA— | | | | | | | | |
| Perth .. .. .. | 963 | 965 | 948 | 859 | 1,127 | 1,116 | 1,097 | 1,072 |
| Kalgoorlie, &c. .. | 1,160 | 1,157 | 1,132 | 846 | 1,388 | 1,370 | 1,343 | 1,245 |
| Mid. Junction, &c. .. | 752 | 858 | 870 | 737 | 1,075 | 1,090 | 1,077 | 1,038 |
| Bunbury .. .. | 878 | 841 | 842 | 667 | 1,133 | 1,101 | 1,081 | 1,027 |
| Geraldton .. .. | 1,384 | 1,377 | 1,252 | 1,069 | 1,289 | 1,293 | 1,247 | 1,177 |
| TASMANIA— | | | | | | | | |
| Hobart .. .. | 822 | 802 | 787 | 816 | 961 | 943 | 926 | 945 |
| Launceston .. .. | 773 | 807 | 805 | 810 | 912 | 915 | 906 | 913 |
| Zeehan .. .. | 576 | 689 | 690 | 448 | 954 | 968 | 947 | 869 |
| Beaconsfield .. .. | 365 | 328 | 318 | 294 | 816 | 769 | 731 | 746 |
| Queenstown .. .. | 724 | 706 | 755 | 583 | 996 | 969 | 970 | 916 |
| **Weighted Average ..** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** |

* For first nine months only.

9. **Sydney and Hobart, Retail Prices for Past Years.**—Reference has already been made (see page 8) to the unsatisfactory nature of the data available in regard to prices in official reports and documents of the States Departments. For two of the metropolitan towns, however (viz., Sydney and Hobart), prices for restricted lists of commodities were found to be available for some years back, and index-numbers have accordingly been computed from these data. It should be observed, however, that there appears to be some doubt as to whether the prices given accurately represent true average prices, and also as to whether they refer to substantially the same qualities or grades of commodities for the whole of the respective periods under review. For example, on inquiry as to the grade or quality of one commodity for which the price given appeared too low, the reply elicited was that "the prices are said to be fair averages, although the price (in question) may perhaps be rather low." It should also be pointed out that

the commodities for which prices are available comprise only groceries, food, beer and tobacco, and that no particulars in regard to house rent are included.

(i.) *Sydney Retail Price Index-Numbers, 1850 to 1912.*—The eighteen commodities included in the computation of the index-numbers given hereunder are as follow, viz.:—Bread, beef, butter, cheese, sugar, tea, potatoes, maize, bacon, eggs, rice, oatmeal, coffee, salt, beer (colonial), soap, starch and tobacco (colonial and imported). These index-numbers have been computed by the aggregate expenditure method already referred to. In the last two columns of the table the index-numbers computed from the data secured by the Commonwealth Bureau of Census and Statistics are given for comparative purposes. These are shewn both inclusive and exclusive of rent, the items included in the former being more closely comparable with those on which the index-numbers for the full period are based.

**Sydney Retail Price Index-Numbers, 1850 to 1911.**

| Year. | Index-Numbers (from State data for Groceries and Food, 18 commodities). | Year. | Index-Numbers (from State data for Groceries and Food, 18 commodities). | Year. | Index Numbers (From State data for Groceries and Food, 18 commodities). | From data secured by Commonwealth Bureau. Without Rent (46 commodities). | With Rent. |
|---|---|---|---|---|---|---|---|
| 1850 | 1,029 | 1871 | 920 | 1892 | 961 | .. | .. |
| 1851 | 1,090 | 1872 | 841 | 1893 | 936 | .. | .. |
| 1852 | 1,100 | 1873 | 925 | 1894 | 822 | .. | .. |
| 1853 | 1,340 | 1874 | 1,005 | 1895 | 810 | .. | .. |
| 1854 | 1,736 | 1875 | 1,038 | 1896 | 823 | .. | .. |
| 1855 | 2,014 | 1876 | 1,002 | 1897 | 813 | .. | .. |
| 1856 | 1,513 | 1877 | 1,042 | 1898 | 808 | .. | .. |
| 1857 | 1,601 | 1878 | 992 | 1899 | 882 | .. | .. |
| 1858 | 1,674 | 1879 | 886 | 1900 | 836 | .. | .. |
| 1859 | 1,422 | 1880 | 882 | 1901 | 916 | 927 | 866 |
| 1860 | 1,402 | 1881 | 889 | 1902 | 1,023 | 1,078 | 950 |
| 1861 | 1,385 | 1882 | 1,087 | 1903 | 966 | 1,040 | 929 |
| 1862 | 1,264 | 1883 | 1,065 | 1904 | 868 | 886 | 846 |
| 1863 | 1,131 | 1884 | 1,010 | 1905 | 976 | 982 | 909 |
| 1864 | 1,161 | 1885 | 1,038 | 1906 | 976 | 974 | 906 |
| 1865 | 1,257 | 1886 | 1,086 | 1907 | 942 | 946 | 898 |
| 1866 | 1,163 | 1887 | 1,008 | 1908 | 1,010 | 1,041 | 956 |
| 1867 | 966 | 1888 | 1,004 | 1909 | 1,018 | 1,023 | 959 |
| 1868 | 1,053 | 1889 | 991 | 1910 | 997 | 1,011 | 965 |
| 1869 | 904 | 1890 | 991 | **1911** | **1,000** | **1,000** | **1,000** |
| 1870 | 939 | 1891 | 973 | 1912* | .. | 1,119 | 1,099 |

* For first 9 months only.

It may be seen, from the above table and from the graph given in paragraph 2 of Section V. hereinafter, that the index-numbers computed for the eighteen commodities since 1850 agree fairly closely for the years 1901 to 1912 with the index-numbers computed for prices of the 46 commodities for which particulars were secured by this Bureau. A comparison with the index-numbers inclusive of house rent (see last column) shews, however, that the former figures cannot be taken as in any way accurately determining relative cost of living. Though the list of commodities included in the index-numbers from

1850 is restricted, in the absence of any more reliable or comprehensive data, the results will serve to indicate the general trend of retail prices in Sydney during these early years.

The figures shew that comparing the average price levels, prices in 1910-11 were 4.72 per cent. higher than in the preceding decade, 13.15 per cent. higher than in 1890-9, 0.80 per cent. lower than in 1880-9, 4.07 per cent. higher than in 1870-9, 17.13 per cent. lower than in 1860-9, and 45.49 per cent. lower than in 1850-9.

After rapidly increasing from 1850 prices reached their maximum level in 1855, and then fell, with occasional recoveries until 1872. The index-numbers from 1871 to 1911 inclusive are shewn in relation to other index-numbers for Australia on the graph referred to in paragraph 2 of Section V. hereinafter.

Reference to this graph will shew that prices were high during the years 1874 to 1877 and again from 1882 to 1886. From 1894 to 1900 prices were especially low, the minimum being reached in 1895. During the last decade prices have generally risen, though there was a marked decline in 1904.

(ii.) *Hobart Retail Price Index-Numbers, 1881 to 1911.*—The seventeen commodities included in the computation of these index-numbers, which have also been obtained by the aggregate expenditure method, are as follow, viz.:—Bacon, bread, butter, candles, cheese, coffee, eggs, flour, ham, ale (colonial), milk, oatmeal, kerosene, rice, sugar, tobacco and tea. In the last two columns the index-numbers for Hobart prices based on the data secured by the Commonwealth Bureau of Census and Statistics are shewn, both inclusive and exclusive, of

**Hobart Retail Price Index Numbers, 1881 to 1911.**

| YEAR. | Index-Numbers (based on State data for 17 commodities, Groceries, Food, etc.). | YEAR. | Index-Numbers (based on State data, 17 commodities). | Index-Numbers (based on data secured by Commonwealth). | |
|---|---|---|---|---|---|
| | | | | Without Rent (46 commodities.) | With Rent. |
| 1881 .. .. | 1,253 | 1897 | 962 | .. | .. |
| 1882 .. .. | 1,212 | 1898 | 939 | .. | .. |
| 1883 .. .. | 1,246 | 1899 | 913 | .. | .. |
| 1884 .. .. | 1,119 | 1900 | 882 | .. | .. |
| 1885 .. .. | 1,224 | 1901 | 940 | 955 | 911 |
| 1886 .. .. | 1,237 | 1902 | 941 | 992 | 937 |
| 1887 .. .. | 1,208 | 1903 | 950 | 996 | 941 |
| 1888 .. .. | 1,229 | 1904 | 945 | 927 | 897 |
| 1889 .. .. | 1,231 | 1905 | 936 | 973 | 929 |
| 1890 .. .. | 1,243 | 1906 | 931 | 990 | 942 |
| 1891 .. .. | 1,140 | 1907 | 944 | 955 | 929 |
| 1892 .. .. | 1,080 | 1908 | 1,000 | 997 | 965 |
| 1893 .. .. | 961 | 1909 | 922 | 1,033 | 998 |
| 1894 .. .. | 959 | 1910 | 848 | 1,015 | 997 |
| 1895 .. .. | 960 | 1911 | **1,000** | **1,000** | **1,000** |
| 1896 .. .. | 973 | 1912* | .. | 1,093 | 1,069 |

* First nine months only.

A comparison for the years 1901 to 1912 between the results secured from the State data for 17 commodities only and those from the Commonwealth data for 46 commodities shews immediately that there is but little agreement between the two sets of figures. The data available from the State official publications is considered to be unsatisfactory, inasmuch as the prices are given in the form of one quotation for the whole of each year, and in many cases a fairly wide range was given, with no indication as to the predominant or average price within that range. For these reasons the index-numbers referred to have been rejected as unreliable.

10. **Tables of Prices and House Rents.**—As this Report forms the basis upon which index-numbers for future months and years will be based, it has been thought desirable to publish, as appendices to this Report, the actual prices of commodities and the actual house-rents upon which the index-numbers given in the preceding paragraphs are based. As already pointed out, average prices and rents for the capital towns have been computed for each year from 1901 to 1912, while for the other towns, for which particulars are now being collected, the information is available for the first nine months of the year 1912 only.

(i.) *Prices in Metropolitan Towns, 1901 to 1912.*—The tables in Appendix II. inclusive shew the average prices of each of the 46 commodities in each capital town from 1901 to 1912 inclusive. Each price is given to the nearest decimal of a penny.

(ii.) *Prices in Metropolitan and Country Towns, 1912.*—The table in Appendix III. gives the prices of each of the 46 commodities for all the towns to which the present investigation has been extended. A weighted average price for all these towns has been computed for each commodity by weighting the price in each town by a number representing its relative population.

(iii.) *House Rents in Metropolitan Towns, 1901 to 1912.*—The table in Appendix IV. shews the average rent for houses of different sizes in each capital town from 1901 to 1912. The rents are given to the nearest decimal of a penny.

(iv.) *House Rents in Metropolitan and Country Towns, 1912.*—In Appendix V. are shewn the average rents in the first nine months of the year 1912 for houses of different sizes in each town for which particulars have been collected. A weighted average rent for each class of house has been computed by weighting the rents in each town by a number representing its relative population.

# III.—WHOLESALE PRICES.

1. **General.**—The data upon which this investigation as to Wholesale Prices is based were obtained mainly from reports of Melbourne market prices published in the ordinary press and in special trade reviews. In any case of doubt as to the reliability of the figures, the records thus obtained were verified by reference to well-known and important business firms dealing in the articles in question. Every care was taken to ensure that the prices quoted for each article refer to a uniform quality, and, in cases where more than one source of information was utilised for obtaining prices of single commodities, special precautions were taken to ensure substantial continuity of quality or grade. In nearly every case monthly prices were obtained and arithmetic averages for the several years were computed. In regard, however, to a few commodities, such as coal, tea, cotton, wool and silk, monthly prices were not available; yearly averages, based in each case upon expert opinion, were secured.

It was at first intended to obtain records, on the lines indicated, for a uniform list of commodities for the capital town of each State. Owing, however, to the difficulty experienced in obtaining regularly the prices of anything like a uniform representative list of commodities from the papers and journals published in some of these towns, this idea has for the present been abandoned. The amount of work involved in taking out the prices since 1871 for Melbourne alone and in performing the necessary arithmetical calculations was very considerable, and the inclusion of similar information for the other capital towns (if it were ultimately found that satisfactory data could have been secured) would have unduly delayed the publication of this Report.

For future months particulars of wholesale prices, with corresponding index-numbers, on uniform lines with the information given herein, will be furnished in the periodical publications to be issued by the Labour and Industrial Branch of this Bureau.

2. **Commodities Included, Sources of Information and Mass Units.**—From the list given below it may be seen that the commodities included in this investigation embrace a large number of the staple articles of Australian consumption and production. The 80 commodities have been distributed into eight groups, and index-numbers have been computed for each group separately, and for all groups together, thus facilitating any analysis of the course of prices or examination as to the cause of fluctuations. It should be observed that, for reasons already indicated (see pp. 16, 18), articles of clothing, boots and shoes and furniture and house furnishing have been excluded.

(i.) *Commodities included and Sources of Information.*—The first three columns of the tabular statement given on pp. 44-6 shew the commodities comprised in each group, the particular brand, grade, or quality (if any) to which the prices refer, and the sources of information from which the prices of each commodity are derived. It may be seen that the commodities included are generally in the nature of raw materials, *i.e.,* materials in which the labour cost is relatively low. Any examination into the relative fluctuations of price in raw materials, as compared with manufactured articles, must for the present be omitted.

(ii.) *Units of Measurement and Mass-Units.*—In the fourth column of the statement given on pages 44-6, the unit of measurement of each

commodity is set out, while in the following column the relative quantities of each commodity (in thousands and in the corresponding units of measurement), are shewn. The last column shews the mass-units adopted in the computation of the index numbers, that is to say it shews the relative extent to which each commodity is used. The meaning of the term "mass-unit," and the application of the mass-unit in the computation of index-numbers by the aggregate expenditure method, have already been explained in Sections I. and II. of this Report. For the rest, it may be said that the method here followed for the computation of the wholesale price index-numbers is the same as that adopted in regard to Retail prices.

**Melbourne Wholesale Prices, Commodities included, Sources of Information, Quantities Consumed, and "Mass-Units."**

| Commodity. | Brand. | Sources of Information. | Unit. | Quantities Consumed. (000 omitted.) | Mass Unit. |
|---|---|---|---|---|---|
| | | GROUP I.—METALS AND COAL (12 COMMODITIES). | | | |
| Iron— | | | | | |
| Pig | Mixed Nos. | Trade Journals* | ton | 64 | 6½ |
| Rod & Bar | Stafford | ,, ,, | ,, | 34 | 3½ |
| Angle & T | ,, | ,, ,, | ,, | 34 | 3½ |
| Plate | ,, | ,, ,, | ,, | 31 | 3 |
| Hoop | ,, | ,, ,, | ,, | 6 | ½ |
| Galvanized | 26 gauge | ,, ,, | ,, | 52 | 5 |
| Fencing Wire | No. 8 | ,, ,, | ,, | 60 | 6 |
| Zinc, Sheet | | ,, ,, | ,, | 8 | 1 |
| Lead, Sheet | | ,, ,, | ,, | 7 | ¾ |
| ,, Pipes | | ,, ,, | ,, | 6 | ½ |
| Copper Sheet | | ,, ,, | lb. | 20,000 | 2,000 |
| Coal | Newcastle on Wharf | Journal of Commerce 1871 and 1872, quoted in Bay Melbourne Papers, 1873 to 1900 Federated Steamship Owners, 1901 to 1912 | ton | 6,004 | 600 |
| | | | | Total | 2,630¼ |
| | | GROUP II.—JUTE, LEATHER, WOOL, ETC. (9 COMMODITIES). | | | |
| Branbags | | Trade Journals* | doz. | 1,090 | 110 |
| Cornsacks | | ,, ,, | ,, | 2,500 | 250 |
| Woolpacks | | ,, ,, | each | 2,000 | 200 |
| Leather Kip | | ,, ,, | lb. | 10,710 | 1,070 |
| ,, Calf | | ,, ,, | ,, | 6,946 | 700 |
| ,, Basils | | ,, ,, | doz. | 257 | 25 |
| Cotton | Raw | London Prices | lb. | 243,200 | 24,000 |
| Silk | ,, | ,, ,, | ,, | 2,635 | 250 |
| Wool | ,, | ,, ,, (Australasian Wool) | ,, | 122,000 | 12,200 |
| | | | | Total | 38,805 |
| | | GROUP III.—GRAINS, ETC. (13 COMMODITIES). | | | |
| Wheat | | Trade Journals* and Melbourne Papers | bushel | 4,853 | 500 |
| Flour | | | ton | 477 | 48 |
| Bran | | | bushel | 14,350 | 1,400 |
| Pollard | | | ,, | 14,350 | 1,400 |
| Oats | Feed | | ,, | 12,365 | 1,200 |
| Oatmeal | Colonial | Trade Journals * and Melbourne Papers, 1891 to date | ton | 16 | 1½ |
| Barley | Malting | | bushel | 1,500 | 150 |
| ,, | Feed | | ,, | 1,000 | 100 |
| Maize | | | ,, | 9,624 | 1,000 |
| Hay | Best Manger | Melbourne Papers | ton | 2,695 | 270 |
| Straw | Victorian | ,, ,, | ,, | 265 | 25 |
| Peas | | Trade Journals* | bushel | 554 | 55 |
| Potatoes | | Melbourne Papers | ton | 402 | 40 |
| | | | | Total | 6,189½ |

* When "Trade Journals" is mentioned it signifies the Journal of Commerce, 1861, 1866, 1871, 1872, and 1883 to 1912, and the Australasian Trade Review 1871 to 1882, and occasionally to 1892.

Melbourne Wholesale Prices, Commodities included, Sources of Information, Quantities Consumed, and "Mass-Units."—continued.

GROUP IV.—DAIRY PRODUCE (7 COMMODITIES).

| Commodity. | Brand. | Sources of Information. | Unit. | Quantities Consumed. (000 omitted.) | Mass Unit. |
|---|---|---|---|---|---|
| Ham | | Melbourne Papers | lb. | 8,000 | 800 |
| Bacon | | | ,, | 32,500 | 3,200 |
| Cheese | | | ,, | 15,000 | 1,500 |
| Butter | Best Fresh | | ,, | 95,000 | 9,500 |
| Lard | In Bladders | | ,, | 2,000 | 200 |
| Eggs | Ordinary | | doz. | 18,000 | 1,800 |
| Honey | | | lb. | 5,847 | 600 |
| | | | | Total | 17,600 |

GROUP V.—GROCERIES (21 COMMODITIES).

| Commodity. | Brand. | Sources of Information. | Unit. | Quantities Consumed. (000 omitted.) | Mass Unit. |
|---|---|---|---|---|---|
| Currants | | Trade Journals* | lb. | 14,000 | 1,400 |
| Raisins | Sultanas | | ,, | 14,000 | 1,400 |
| Herrings | 1lb. tins | | doz. 1 lb. tins | 500 | 50 |
| Salmon | ,, | | ,, | 500 | 50 |
| Sardines | Halves | | doz. halves | 1,000 | 100 |
| Coffee | Plantation | | lb. | 2,100 | 200 |
| Cocoa | Taylor's | | ,, | 1,000 | 100 |
| Sugar | No. 1A or its equivalent in former years | | ton | 220 | 22 |
| Macaroni | | | lb. | 2,000 | 200 |
| Sago | | | ,, | 7,750 | 800 |
| Rice | Patna | | ton | 22 | 2 |
| Salt | Liverpool fine | | ,, | 70 | 7 |
| Salt | Rock | | ,, | 10 | 1 |
| Mustard | 1871–83 D.S.F. In 1884–1911 1 lb tins Coleman's | | doz. 1 lb. tins | 64 | 6 |
| Starch | Coleman's White | | lb. | 1,000 | 100 |
| Blue | Keen's | | lb. | 500 | 50 |
| Matches | Wooden Safety | | gross | 860 | 90 |
| Candles | Gouda | | lb. | 16,000 | 1,600 |
| Tobacco | Two Seas in Pocket Pieces | | lb. | 13,000 | 1,300 |
| Tea | | London Prices | lb. | 30,000 | 3,000 |
| Kerosene | | Trade Journals* | gallon | 17,500 | 1,700 |
| | | | | Total | 12,178 |

GROUP VI.—MEAT (5 COMMODITIES).

| Commodity. | Brand. | Sources of Information. | Unit. | Quantities Consumed. (000 omitted.) | Mass Unit. |
|---|---|---|---|---|---|
| Beef | Average quality. | † Metropolitan Meat Market Reports | 100 lbs. | 3,875 | 390 |
| Mutton | ,, | | lb. | 332,000 | 33,000 |
| Veal | ,, | | lb. | 20,000 | 2,000 |
| Lamb | ,, | | each | 2,047 | 200 |
| Pork | ,, | | lb. | 37,000 | 3,700 |
| | | | | Total | 39,290 |

* See footnote * on opposite page. † Gippsland Mercury, 1890–1892, Melbourne Papers, 1893–1912

Melbourne Wholesale Prices, Commodities included, Sources of Information, Quantities Consumed, and "Mass-Units."—continued.

| Commodity. | Brand. | Sources of Information. | Unit. | Quantities Consumed, (000 omitted.) | Mass Unit. |
|---|---|---|---|---|---|
| GROUP VII.—BUILDING MATERIALS (9 COMMODITIES). | | | | | |
| Timber :— | Flooring 6 x 1⅛ | Trade Journals* | 100 ft. lin. | 300 | 30 |
| | ,, 6 x ⅞ | | ,, | 300 | 30 |
| | ,, 6 x ¾ | | ,, | 300 | 30 |
| | ,, 6 x ½ | | ,, | 300 | 30 |
| | Weather-boards | | ,, | 2,000 | 200 |
| | Oregon | | 1,000 ft. sup | 200 | 20 |
| | Shelving | | ,, | 100 | 10 |
| Cement | Portland | | cask | 312 | 30 |
| White Lead | | | ton | 8 | ¾ |
| | | | | Total | 380¾ |
| GROUP VIII.—CHEMICALS (4 COMMODITIES). | | | | | |
| Cream of Tartar | In Kegs | Trade Journals* | lb. | 4,030 | 400 |
| Carbonate of Soda | | | ton | 3 | ½ |
| Saltpetre | Refined | | ,, | ⅓ | 1/20 |
| Sulphur | | | ,, | 2 | ¼ |
| | | | | Total | 400⅘ |

* See footnote * on page 44.

3. **Relative Importance of Groups** — The relative importance of any group is, of course, gauged by computing the relative expenditure thereon, that is by taking the sum of the products of the prices of the commodities in each group and their corresponding "mass-units," and comparing this sum with the total expenditure on any other group or on all groups. The relative expenditures thus obtained, and the percentage of the expenditure on each group, on the total expenditure, are shewn in the subjoined table. The relative, as well as the total expenditures, depend, of course, upon the prices, the mass-units being constant. In the computation of the figures shewn in the following table, the relative importance of the groups is shewn for both 1871 and for 1911. It will be seen, of course, that they are not quite identical, since the variations of the prices for each group are not identical.

**Wholesale Prices, 1871 and 1911, Relative Importance of Groups.**

| Particulars. | | Group I. Metals and Coal. | Group II. Jute, Leather, &c. | Group III. Agricultural Produce. | Group IV. Dairy Produce. | Group V. Groceries. &c. | Group VI. Meat. | Group VII. Building Materials. | Group VIII. Chemicals. | All Groups. |
|---|---|---|---|---|---|---|---|---|---|---|
| Relative Expenditure | 1871 | 23,515 | 44,460 | 61,912 | 12,589 | 40,096 | 19,148* | 9,190 | 724 | 211,634 |
| | 1911 | 21,447 | 35,378 | 50,111 | 14,574 | 25,350 | 16,640 | 8,802 | 514 | 172,816 |
| Percentage on Total Expenditure | 1871 | 11.1 | 21.0 | 29.3 | 6.0 | 19.0 | 9.0 | 4.3 | 0.3 | 100. |
| | 1911 | 12.4 | 20.5 | 29.0 | 8.4 | 14.7 | 9.6 | 5.1 | 0.3 | 100. |

* 1884 prices.

From this table it may be seen that Group III. (Agricultural produce), is by far the most important, the expenditure thereon amounting to no less than 29.0 per cent. of the total expenditure. The next group in order of importance is No. II., the expenditure thereon being 20.5 per cent. of the total, followed in the order named by Groups V. (14.7 per cent.), I. (12.4 per cent.), VI. (9.6 per cent.), IV. (8.4 per cent.), VII. (5.1 per cent.), and VIII. (0.3 per cent.).

The expenditure on food stuffs in 1911 (Groups III., IV., V., and VI.), amounted in all to 61.7 per cent. on the total expenditure, and it will be seen hereinafter that the variations in the prices of the commodities included in these groups have often, and especially in times of drought and consequent high prices, a predominating influence on the level of the index-numbers for all groups.

4. **Index-Nubmers and Graphs.**—As already stated index-numbers have been computed for each group of commodities, as well as for all groups together. The index-numbers for the several groups and for all groups together are shewn in the table on page 48. In regard to Group VI. it should be observed that reliable and uniform records as to prices of meat could not be obtained further back than 1890 (except for the years 1884 and 1885). Index-numbers were accordingly worked out for the full period since 1871 for the seven groups, *excluding* meat, and also for the period since 1890, for the eight groups, *including* meat. The figures shewn in the last column of the subjoined table for years prior to 1890 (except for 1884 and 1885) have accordingly been adjusted (on the basis of the results for succeeding years) so as to include meat.

(i.) *Table of Index-Numbers.*—The index-numbers have in each case been computed with the prices in the year 1911 as base; that is to say, *they shew the amount which would have had to be expended in each of the years specified in order to purchase what would have cost £1000 in 1911, distributed in purchasing the relative quantities (indicated by the mass-units) of the several commodities included in each group and in all groups respectively.* Thus in the last column it may be seen that the cost of the relative quantities of the various commodities was 1229 in 1871, and 974 in 1901, as compared with 1000 in 1911 and 1174 in 1912. In other words, prices were lower in 1911 than in either 1871 or 1912, and the purchasing power of money in 1911 was accordingly greater. Again, prices were higher in 1911 than in 1901, and the purchasing power of money in the former year was accordingly less.

It should be observed that the figures for 1912 are based on the prices for the first nine months only, and that in some cases the results are incomplete.

**Melbourne Wholesale Prices, Index Numbers, 1861, 1866, and 1871 to 1912, Computed to Year 1911 as Base.**

| YEAR. | I. Metals and Coal. | II. Jute, Leather, &c. | III. Agricultural Produce, &c. | IV. Dairy Produce. | V. Groceries. | VI. Meat. | VII. Building Materials. | VIII. Chemicals. | All commodities together. |
|---|---|---|---|---|---|---|---|---|---|
| 1861 | 1,438 | 1,381 | 1,583 | 1,008 | 1,963 | — | 1,070 | 2,030 | **1,538** |
| 1866 | 1,225 | 1,902 | 1,892 | 1,749 | 1,889 | — | 931 | 1,741 | **1,752** |
| 1871 | 1,096 | 1,257 | 1,236 | 864 | 1,586 | — | 1,044 | 1,409 | **1,229** |
| 1872 | 1,456 | 1,394 | 1,246 | 1,019 | 1,608 | — | 1,097 | 1,537 | **1,335** |
| 1873 | 1,816 | 1,362 | 1,422 | 1,032 | 1,581 | — | 1,446 | 1,661 | **1,451** |
| 1874 | 1,635 | 1,240 | 1,456 | 1,160 | 1,476 | — | 1,138 | 1,668 | **1,387** |
| 1875 | 1,487 | 1,230 | 1,361 | 1,345 | 1,435 | — | 1,009 | 1,554 | **1,337** |
| 1876 | 1,406 | 1,146 | 1,446 | 1,415 | 1,462 | — | 1,054 | 1,532 | **1,350** |
| 1877 | 1,400 | 1,149 | 1,347 | 1,303 | 1,502 | — | 1,047 | 1,569 | **1,311** |
| 1878 | 1,329 | 1,094 | 1,269 | 1,112 | 1,378 | — | 886 | 1,411 | **1,216** |
| 1879 | 1,266 | 1,060 | 1,298 | 1,146 | 1,371 | — | 852 | 1,444 | **1,210** |
| 1880 | 1,347 | 1,101 | 954 | 900 | 1,412 | — | 943 | 1,626 | **1,109** |
| 1881 | 1,178 | 1,115 | 1,012 | 935 | 1,421 | — | 1,091 | 1,587 | **1,121** |
| 1882 | 1,297 | 1,032 | 1,444 | 1,347 | 1,414 | — | 1,005 | 1,493 | **1,289** |
| 1883 | 1,231 | 1,021 | 1,237 | 1,114 | 1,408 | — | 910 | 1,484 | **1,183** |
| 1884 | 1,208 | 997 | 1,124 | 1,156 | 1,326 | 1,151 | 876 | 1,471 | **1,132** |
| 1885 | 1,216 | 921 | 1,156 | 1,316 | 1,158 | 1,042 | 880 | 1,432 | **1,105** |
| 1886 | 1,164 | 835 | 1,222 | 1,286 | 1,139 | — | 730 | 1,398 | **1,089** |
| 1887 | 1,053 | 883 | 1,184 | 1,091 | 1,128 | — | 790 | 1,401 | **1,055** |
| 1888 | 1,216 | 870 | 1,123 | 1,210 | 1,122 | — | 937 | 1,378 | **1,074** |
| 1889 | 1,061 | 886 | 1,505 | 1,082 | 1,152 | — | 940 | 1,228 | **1,171** |
| 1890 | 1,402 | 911 | 1,022 | 1,099 | 1,074 | 1,007 | 880 | 1,257 | **1,053** |
| 1891 | 895 | 847 | 1,024 | 995 | 1,032 | 888 | 780 | 1,194 | **945** |
| 1892 | 889 | 800 | 971 | 1,066 | 997 | 901 | 704 | 1,149 | **918** |
| 1893 | 856 | 783 | 834 | 842 | 1,033 | 816 | 739 | 1,018 | **850** |
| 1894 | 752 | 721 | 644 | 708 | 1,057 | 695 | 731 | 934 | **749** |
| 1895 | 720 | 684 | 734 | 712 | 1,016 | 682 | 789 | 1,003 | **760** |
| 1896 | 808 | 749 | 1,116 | 875 | 1,021 | 808 | 780 | 1,065 | **922** |
| 1897 | 813 | 706 | 1,063 | 937 | 1,009 | 1,072 | 766 | 971 | **925** |
| 1898 | 842 | 683 | 920 | 1,034 | 1,000 | 1,091 | 838 | 933 | **895** |
| 1899 | 933 | 717 | 670 | 814 | 1,003 | 960 | 805 | 892 | **809** |
| 1900 | 1,042 | 861 | 703 | 838 | 1,039 | 1,168 | 911 | 908 | **894** |
| 1901 | 1,061 | 774 | 928 | 1,029 | 1,048 | 1,345 | 841 | 917 | **974** |
| 1902 | 1,007 | 756 | 1,192 | 1,215 | 945 | 1,447 | 837 | 881 | **1,051** |
| 1903 | 923 | 834 | 1,209 | 1,059 | 936 | 1,443 | 875 | 921 | **1,049** |
| 1904 | 821 | 885 | 754 | 876 | 916 | 1,427 | 845 | 875 | **890** |
| 1905 | 772 | 850 | 894 | 980 | 942 | 1,209 | 801 | 859 | **910** |
| 1906 | 882 | 978 | 916 | 972 | 923 | 1,110 | 896 | 864 | **948** |
| 1907 | 1,037 | 1,017 | 973 | 1,020 | 948 | 1,294 | 968 | 961 | **1,021** |
| 1908 | 1,033 | 901 | 1,312 | 1,198 | 968 | 1,335 | 935 | 891 | **1,115** |
| 1909 | 1,014 | 907 | 1,000 | 1,119 | 978 | 1,088 | 911 | 815 | **993** |
| 1910 | 1,004 | 1,052 | 969 | 1,100 | 999 | 1,008 | 996 | 898 | **1,003** |
| **1911** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** |
| 1912* | 1,015 | 1,057† | 1,263 | 1,248 | 1,085‡ | 1,291 | 1,041 | 944 | **1,174** |

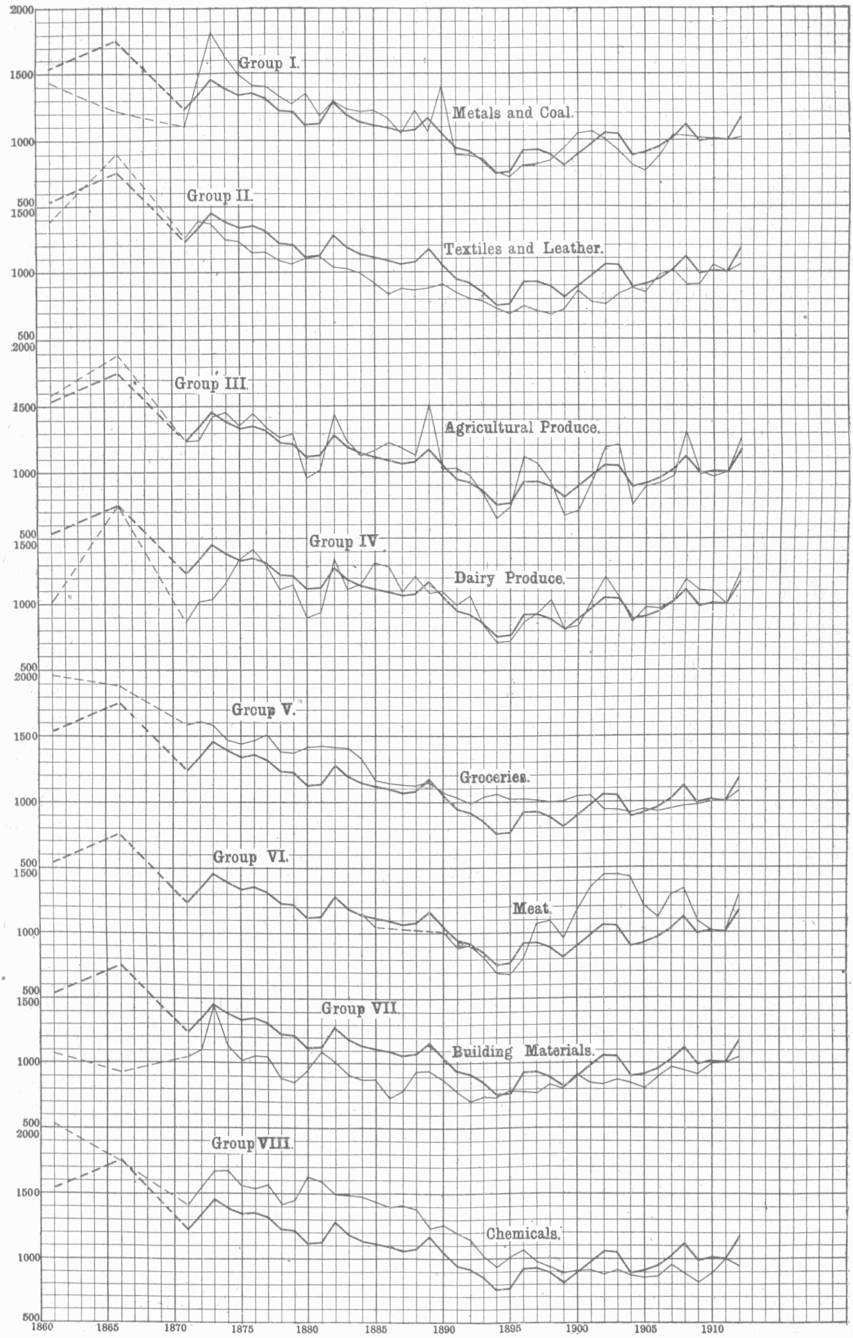
* First 9 months, January to September (inclusive).
† Omitting Cotton, Silk and Wool. ‡ Omitting Tea.

(ii.) *Reversibility of Index-Numbers.*—It has already been pointed out that these index-numbers are *reversible;* that is to say if it is desired to take any year, other than 1911, as base, the necessary index-numbers may readily be computed, by dividing each index-number by the index-number in the base year and multiplying the result by 1000. Thus, referring to the last column, if it be desired to compare prices in 1912 with those in 1900 as base (= 1000 instead of 894), the index number for the former year (1912) is

$$\frac{1174}{894} \times 1000 = 1313,$$ an increase on 1900 of 31.3 per cent.

(iii.) *Graphs.*—The index-numbers are shewn for each group and for all groups toegther in the following graphs. The heavy line in each graph represents the index-numbers for the weighted average of

MELBOURNE WHOLESALE PRICE INDEX-NUMBERS, 1861 TO 1912.*




* Numbers for 1912 are based on average prices in the first nine months only.

all groups, and is shewn so that comparison may be made between the price levels for all commodities and those for the commodities comprised in each group separately. The index-numbers for the individual groups are represented by the light lines. The broken lines at the commencement of each graph shew the index-numbers for the years 1861 and 1866, the continuous records commencing with the year 1871.

(iv.) *Tables of Prices.*—The average annual prices of each commodity included in this investigation are shewn in Appendix VI. hereof.

5. **General Results of Investigation.**—(i.) *From 1871 to 1880.*—Referring to the index-numbers given on page 48, and to the graphs thereof on page 49, it will be noticed that, in regard to the index-numbers for all commodities (disregarding the figures given for the years 1861 and 1866), the first noticeable feature is the rise from 1871 to 1873, followed by a rapid fall until 1880, with the exception of a small rise in 1876. From 1869 to 1873 there was a world-wide boom in trade, which in England and other countries carried prices to a level which had not been reached for fifty years. This boom constituted a period of great inflation of credit and business, as well as of prices, and has variously been attributed to excessive speculation, to extensive and injudicious construction of railroads in the United States of America, Central Europe, and Russia, to the opening of the Suez Canal, and to the Franco-German war. On reference to the graphs of the individual groups it will be seen that this rise was most marked in the case of metals and coal (Group I.), and it was these commodities that the boom chiefly affected, for the stimulus imparted by the developments of the 'fifties and 'sixties chiefly took the form of a demand for railways, ships and machinery. The index-numbers for all other groups, except, perhaps, that for groceries (Group V.), shew a distinct upward movement at this period. It may be seen that in regard to agricultural and dairy products (Groups III. and IV.), this rise did not reach its maximum until a few years later, viz., in 1874 and 1876 respectively. This was largely owing to local conditions and especially to the severe drought of 1876-7.

It will be seen hereinafter (see Section VI. hereof) that the decline in prices which set in in 1873 was world-wide. This fall has been ascribed to the same factors as are generally recognised as the causes of similar downward movements. When trade is good a state of affairs is created in which a downward movement of prices is said to be sooner or later inevitable. A great stimulus is given to production, capital is employed in establishing new factories or in extending works or plant, workers are attracted to certain favoured industries by increased wages; then at a certain stage the demand is found to be less than the supply, the prices of the manufactured articles fall, and in time the raw materials and labour employed are at a discount. It is stated, moreover, that the fall is often precipitated by the inability of speculative holders of stocks to hold on in face of falling markets. At each new stage of the decline new sales become necessary till there is apparently no limit to the fall, just as before there seemed to be no limit to the rise. By sympathy almost all markets tend to be affected, the low prices in one market attracting capital to it, and so weakening other markets, while

speculators who are hit in one branch of trade seek to cover their losses by sales of some commodity or stock which has not depreciated. This is often stated to be the ordinary explanation of a general fall in prices.* The consideration of what is commonly alleged to be another important factor, viz., the gold supply, is dealt with in a later part of this Report (see Section IX.).

(ii.) *From 1881 to 1890.*—The chief features of the graph during this period are the rises in 1882 and 1889. These rises appear to be largely due to local conditions, though, as will appear later, they occur to a smaller extent in the price-indexes of other countries. They are especially noticeable in the prices of agricultural and dairy produce and building materials (see graphs of Groups III., IV., and VII.), and were to a large extent brought about by the droughts in the seasons 1880-1 and 1888-9 (see graph of Rainfall on p. 58). In the opinion of some observers the causes which brought about these temporary rises in 1882 and 1889 may eventually have helped to accentuate the decline which did not terminate until 1894. It is commonly recognised that unfavourable weather and bad seasons have a most potent influence in conducing to depression in trade and a consequent fall in prices. One bad season among several good ones may not, of course, have much visible influence, but a succession of them is recognised as a powerful cause of michief. The usual explanation has been that a bad season, leading directly to a high price of certain necessaries of life, causes immediate distress among the masses of the consumers, whose purchases of manufactured commodities fall off, with the result that the persons employed in the trades so affected are also impoverished, and so by a quick round all trades tend to be adversely affected. In Australia, a country whose wealth is largely dependent upon primary industries, the effect of bad seasons is well known. In the year 1910 the value of the Commonwealth production from the agricultural, pastoral, dairying, etc., industries was £114,132,000, or no less than 60.8 per cent. on the estimated total value of production (£187,734,000). In earlier years, before the development of manufacturing industries, this percentage was probably greater. It may readily be understood, therefore, that in the case of even one bad season, resulting in a falling off of say 20 per cent. in the production of these primary industries, the cumulative effect on the spending powers of the community, and hence on prices, may be considerable.

(iii.) *From 1891 to 1901.*—This period is one of low prices, the decline which set in in 1889 continuing until the year 1894, when the index-number reached the low value of 749. Since 1873, that is in twenty-one years, the index-number fell from 1451 to 749, a decline of nearly 50 per cent. As will be seen later, *this decline was world-wide*, and the statement has been ventured by some economists that it was, in extent and character, without precedent in the modern world's history. On reference to the group diagrams on page 49, it may be seen that the decline in Australia was common to all groups. The fact, however, that the prices of some commodities fell much more than those of other

* See "Economic Inquiries and Studies," by Sir Robert Giffen, K.C.B., Vol. I., p. 134. (London, 1904.)

commodities had the effect of accentuating the economic disturbance, which manifested itself by numerous signs of industrial, commercial and agricultural depression.

In 1896 the index-number rose to 922, but fell again in 1899 to 809. The next year marks the commencement of another rise. The increase in prices in 1896 is again attributable to local conditions, and occurs mainly in commodities comprised in Groups III., IV. and VI., viz., agricultural and dairy products and meat. Reference to the graph of Rainfall on page 58 again shews that this period was one of severe drought.

(iv.) *From 1901 to 1910.*—The rise which began in 1898-9 continued for three years, and again the increase is most noticeable in regard to the groups comprising foodstuffs, viz., Groups III., IV. and VI. This rise followed on the severe drought of 1901-2, and after being maintained for one year was succeeded by a sudden fall from 1049 in 1903 to 890 in 1904. In that year a rise again set in, and was maintained for several years, culminating in 1908, when there was again a drought. In 1909 the price-index fell to a level which was substantially maintained for two years.

(v.) *From 1911 to Present Time.*—During the year 1912 there was a sharp rise in the index-number, the figure 1174 being computed on the average prices for nine months only of the year. The increase is again most marked in the groups comprising foodstuffs, and was no doubt largely due to the drought in the earlier part of the year.

(vi.) *Average Level of Index-Numbers in Quinquennial Periods.*—The net results of this investigation may be more clearly indicated by a consideration of the average level of the index-numbers over periods of several years. The somewhat violent fluctuations seen in the graphs indicate that the significance of comparisons between any particular years is not apparent. In order to illustrate the method which may be employed in making comparisons between the average price level over different periods, the average level of the price-indexes during each quinquennial period and during the years 1911 and 1912 (first nine months only) have been computed for each group and for all groups together. Each average thus obtained has then been taken as the base (= 1000), and the corresponding index-number for 1911-12 has been computed. These index-numbers for 1911-12 are shewn in the following table; each number represents (for its respective group or for all groups together, as the case may be) *the index-number for 1911-12 compared with the average expenditure for each quinquennium as base;* that is to say, it represents the amount which would have had to be expended according to the average prices in 1911 and 1912 in order to purchase such relative quantities (indicated by the mass-units) of each commodity as would have cost 1000 units at the prices prevailing in the corresponding base period.

**Index-Numbers for 1911-12, with Average Expenditure in each successive Quinquennial Period, as base (= 1,000).**

| Base Period (Prices =1,000) | I. Metals and Coal. | II. Jute, Leather, &c. | III Agricultural Produce. | IV. Dairy Produce. | V. Groceries | VI. Meat. | VII. Building Materials | VIII. Chemicals. | All Groups together. |
|---|---|---|---|---|---|---|---|---|---|
| 1871–5 .. | 672 | 792 | 841 | 1,037 | 678 | — | 889 | 621 | 806 |
| 1876–80 .. | 746 | 926 | 895 | 957 | 731 | — | 1,067 | 641 | 877 |
| 1881–85 .. | 821 | 1,012 | 946 | 957 | 775 | — | 1,071 | 651 | 932 |
| 1886–90 .. | 854 | 1,172 | 934 | 974 | 928 | — | 1,193 | 730 | 999 |
| 1891–95 .. | 1,225 | 1,340 | 1,345 | 1,299 | 1,015 | 1,438 | 1,362 | 917 | 1,288 |
| 1896–1900 .. | 1,134 | 1,383 | 1,265 | 1,249 | 1,028 | 1,122 | 1,244 | 1,019 | 1,222 |
| 1901–05 .. | 1,098 | 1,224 | 1,137 | 1,089 | 1,089 | 833 | 1,214 | 1,091 | 1,115 |
| 1906–10 .. | 1,013 | 1,059 | 1,094 | 1,039 | 1,082 | 981 | 1,084 | 1,097 | 1,070 |

The above table shews, for example, in regard to the index-numbers for the whole of the commodities included (see last column), that, taking the average price level in 1871-5 as 1000, prices had fallen in 1911-12 to 806, and similarly, taking the average level for the period 1876-80 as 1000, prices had fallen in 1911-12 to 877. Compared with the average for each quinquennial period up to, and including, 1886-90, prices in 1911-12 had fallen, but in comparison with the average for succeeding periods it is seen that prices in 1911-12 had risen. Thus, the price level in the latter period (1911-12) compared with the average for 1891-5 was 1288, and with that for the next period 1222, with the next 1115, and with the five years immediately preceding the year 1911 was 1070. In other words, wholesale prices in Melbourne in 1911-12 were 28.8 per cent. higher than the average for 1891-5, 22.2 per cent. higher than in 1896-1900, 11.5 per cent. higher than 1901-5, and 7.0 per cent. higher than 1906-10. In a subsequent report it is intended to shew the yearly progression of the quinquennial average.

6. **Metals and Coal (Group I.).**—This group comprises twelve commodities, the prices of which, except perhaps in the case of coal, depend almost entirely upon the prices in the world's markets, though in some cases they vary to a certain extent according to the amount of import duty imposed. The average annual prices of each commodity comprised are specified in Appendix VI.

In order to shew the relative fluctuations in price for certain of the more important commodities comprised in this group, the prices given in the tables in Appendix VI. have, in the case of pig-iron and coal, been converted into price-ratios, taking the price in 1911 as the base. That is to say, taking the price of each commodity as 1000 in 1911, the relative prices for other years have been computed; the results therefore shew the variations in price compared with 1911. These price-ratios are shewn in the following table:—

## Melbourne Wholesale Prices, 1871 to 1912.

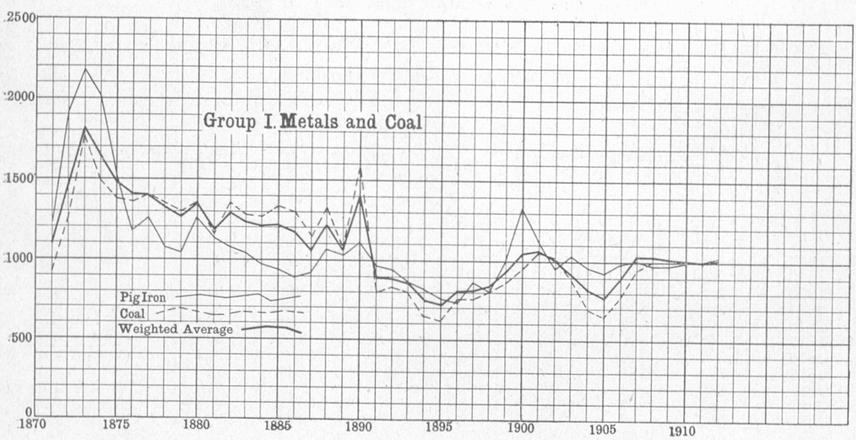
PRICE-RATIOS FOR PIG IRON AND COAL, AND PRICE-INDEX FOR WHOLE GROUP II.

| Year. | Pig Iron. | Coal. | Index-Number for whole Group. | Year. | Pig Iron. | Coal. | Index-Number for whole Group. | Year. | Pig Iron. | Coal | Index-Number for whole Group. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1871 | 1,221 | 922 | 1,096 | 1885 | 935 | 1,333 | 1,216 | 1899 | 1,005 | 867 | 933 |
| 1872 | 1,910 | 1,263 | 1,456 | 1886 | 891 | 1,300 | 1,164 | 1900 | 1,336 | 950 | 1,042 |
| 1873 | 2,180 | 1,766 | 1,816 | 1887 | 921 | 1,144 | 1,053 | 1901 | 1,113 | 1,055 | 1,061 |
| 1874 | 2,016 | 1,493 | 1,635 | 1888 | 1,063 | 1,331 | 1,216 | 1902 | 955 | 1,022 | 1,007 |
| 1875 | 1,530 | 1,380 | 1,487 | 1889 | 1,030 | 1,067 | 1,061 | 1903 | 1,036 | 885 | 923 |
| 1876 | 1,170 | 1,357 | 1,406 | 1890 | 1,109 | 1,578 | 1,402 | 1904 | 961 | 699 | 821 |
| 1877 | 1,258 | 1,402 | 1,400 | 1891 | 964 | 800 | 895 | 1905 | 924 | 644 | 772 |
| 1878 | 1,072 | 1,352 | 1,329 | 1892 | 939 | 830 | 889 | 1906 | 993 | 767 | 882 |
| 1879 | 1,038 | 1,300 | 1,266 | 1893 | 868 | 800 | 856 | 1907 | 1,001 | 955 | 1,037 |
| 1880 | 1,260 | 1,361 | 1,347 | 1894 | 818 | 648 | 752 | 1908 | 978 | 1,000 | 1,033 |
| 1881 | 1,126 | 1,154 | 1,178 | 1895 | 756 | 613 | 720 | 1909 | 978 | 1,000 | 1,014 |
| 1882 | 1,076 | 1,361 | 1,297 | 1896 | 731 | 759 | 808 | 1910 | 998 | 1,000 | 1,004 |
| 1883 | 1,038 | 1,278 | 1,231 | 1897 | 867 | 759 | 813 | **1911** | **1,000** | **1,000** | **1,000** |
| 1884 | 971 | 1,268 | 1,208 | 1898 | 805 | 804 | 842 | 1912* | 1,023 | 1,000 | 1,015 |

* For first 9 months only.

The fluctuations in the above figures may be more readily seen by reference to the following graphs, in which the thin continuous line represents the price-ratios for pig-iron, the broken line those for coal, while the heavy continuous line shows the price-index for the whole group.

MELBOURNE WHOLESALE PRICES 1871 TO 1912.*—METALS AND COAL (GROUP I.). GRAPH SHEWING PRICE-RATIOS FOR PIG IRON AND COAL AND PRICE-INDEX FOR WHOLE GROUP.




* Average price for first nine months only of year 1912.

It may be seen that prices rose rapidly from 1871 to 1873, reaching a maximum in the latter year. This increase was due to the boom in these years, which was especially marked in the iron and coal trades. Broadly speaking, prices fell until 1895, but there were temporary increases, which were especially marked in 1888 and 1890. After 1895, when prices reached their minimum value for the period under review,

there was a marked recovery, in 1900 a high level being reached. There was then a decline until 1905, followed by a sharp rise in 1906 and 1907. Since the latter year prices have remained fairly constant. During the nine months to which the figures for 1912 relate, prices of metal were on the upward grade, more especially during the latter part of that period.

The average level of the prices of commodities included in this group in 1911-12 compared with each preceding quinquennium may be seen by reference to the table on page 53 hereinbefore.

The figures in the first column of that table shew that average prices in this group were lower in 1911-12 than in any of the quinquennial periods from 1871 to 1890, and higher than from 1891 to 1910. For example, it may be seen that, compared with the average level in 1871-5, the prices-index for 1911-12 was 672, that is to say prices were 328 (1000—672) less in 1911-12. Similarly prices in 1911-12 were 1.3 per cent. higher than in 1906-10, 9.8 per cent. higher than in 1901-5, and so on.

7. **Textiles and Leather (Group II.).** —This group includes nine commodities (see p. 44), of which three are manufactured jute goods, three are leather and three are raw materials (cotton, silk and wool).

The relative fluctuations in the price-ratios of some of the more important commodities (leather, cotton and wool) in this group are shewn in the following table in relation to the price-index for the whole group. It should be observed that these ratios are computed with the price in 1911 as the base (1000), and also that the figures for 1912 are incomplete.

**Melbourne Wholesale Prices, 1871 to 1912.**

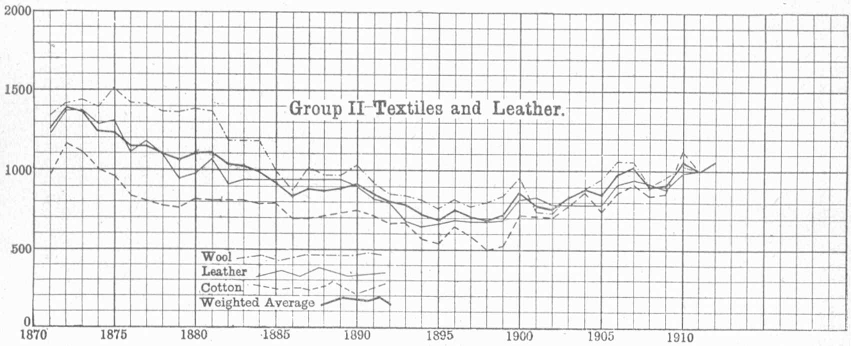
PRICE-RATIOS FOR LEATHER, COTTON, AND WOOL, AND PRICE-INDEX FOR WHOLE GROUP II.

| Year. | Leather (Kip.) | Cotton | Wool. | Index-No. for whole Group. | Year. | Leather (Kip.) | Cotton. | Wool. | Index-No. for whole Group. |
|---|---|---|---|---|---|---|---|---|---|
| 1871 | 1,229 | 975 | 1,341 | 1,257 | 1892 | 791 | 661 | 847 | 800 |
| 1872 | 1,366 | 1,169 | 1,412 | 1,394 | 1893 | 679 | 669 | 835 | 783 |
| 1873 | 1,369 | 1,105 | 1,435 | 1,362 | 1894 | 640 | 572 | 812 | 721 |
| 1874 | 1,281 | 1,000 | 1,394 | 1,240 | 1895 | 660 | 540 | 759 | 684 |
| 1875 | 1,304 | 960 | 1,517 | 1,230 | 1896 | 686 | 645 | 817 | 749 |
| 1876 | 1,108 | 839 | 1,423 | 1,146 | 1897 | 679 | 581 | 770 | 706 |
| 1877 | 1,176 | 806 | 1,412 | 1,149 | 1898 | 679 | 500 | 800 | 683 |
| 1878 | 1,091 | 774 | 1,365 | 1,094 | 1899 | 686 | 524 | 835 | 717 |
| 1879 | 941 | 758 | 1,359 | 1,060 | 1900 | 817 | 718 | 953 | 861 |
| 1880 | 974 | 814 | 1,382 | 1,101 | 1901 | 827 | 710 | 735 | 774 |
| 1881 | 1,065 | 806 | 1,365 | 1,115 | 1902 | 784 | 701 | 729 | 756 |
| 1882 | 912 | 806 | 1,182 | 1,032 | 1903 | 784 | 774 | 835 | 834 |
| 1883 | 941 | 806 | 1,182 | 1,021 | 1904 | 784 | 863 | 888 | 885 |
| 1884 | 941 | 790 | 1,176 | 997 | 1905 | 784 | 734 | 941 | 850 |
| 1885 | 941 | 790 | 988 | 921 | 1906 | 918 | 855 | 1,053 | 978 |
| 1886 | 941 | 693 | 876 | 835 | 1907 | 941 | 911 | 1,047 | 1,107 |
| 1887 | 941 | 693 | 1,012 | 883 | 1908 | 918 | 839 | 906 | 901 |
| 1888 | 941 | 710 | 970 | 870 | 1909 | 885 | 855 | 953 | 907 |
| 1889 | 941 | 726 | 970 | 886 | 1910 | 987 | 1,121 | 1,023 | 1,052 |
| 1890 | 900 | 742 | 1,029 | 911 | **1911** | **1,000** | **1,000** | **1,000** | **1,000** |
| 1891 | 820 | 710 | 918 | 847 | 1912* | 1,000 | † | † | 1,057‡ |

* Figures for first nine months. † Not available.
‡ Exclusive of Cotton, Silk and Wool.

These price-ratios and the price-index for the whole group are shewn in the following graphs, in which the heavy and light continuous lines represent respectively the price-index for the whole group and the price-ratios for leather; the upper broken line represents wool and the lower cotton.

MELBOURNE WHOLESALE PRICES, 1871 TO 1912.*—TEXTILES AND LEATHER (GROUP II.). GRAPH SHEWING PRICE-RATIOS FOR LEATHER, COTTON AND WOOL, AND PRICE-INDEX FOR WHOLE GROUP.




* Average for first nine months only of year 1912.

Generally speaking, there is considerable similarity between these graphs. It may be seen that there was a general fall in prices until about the year 1898, and that since that year there has been a fairly marked rise. The price of cotton reached a maximum in 1872 and a minimum in 1898, while its price had so far recovered in later years that in 1910 it nearly equalled its previous maximum; the price-index for the whole group reached its maximum and minimum in the same years respectively. As regards wool, it may be seen that the average price of Australasian wool in London was highest (1s. 4⅛d. per lb) in 1875 and lowest (9⅜d. per lb.) in 1902, and that since the latter date there has been a considerable rise in price.

Figures shewing comparisons of the average price-level in 1911-12, compared separately with each preceding quinquennium, may be found on page 53 hereinbefore. It may be seen that the average level in 1911-12 was lower than in each of the two quinquennial periods—1871-5 and 1876-80—but was higher than in each succeeding quinquennium. It may be observed that there has been a considerable increase in prices since 1896, the level for 1911-12 being 38.3 per cent. higher than in 1896-1900, 22.4 per cent. higher than in 1901-5, and 5.9 per cent. higher than in 1906-10.

8. **Agricultural Produce (Group III.)**—This group is the most important of any, the expenditure thereon by the community amounting to about 29 per cent. of the total expenditure on all groups included in this investigation. It includes thirteen commodities, and of these the price-ratios (with the average price in 1911 as base) have been computed for wheat, flour, oats, hay and potatoes. These price-ratios are shewn in the following table, in which figures have also been included

giving the mean annual rainfall in Victoria (in inches), the production of wheat in Victoria (in 1000 bushels), the retail price-ratios for bread in Melbourne, and the price-index for the whole group.

**Melbourne Wholesale Prices, 1871 to 1912.—Price-Ratios for Various Commodities and Price-Index for Whole Group III.**

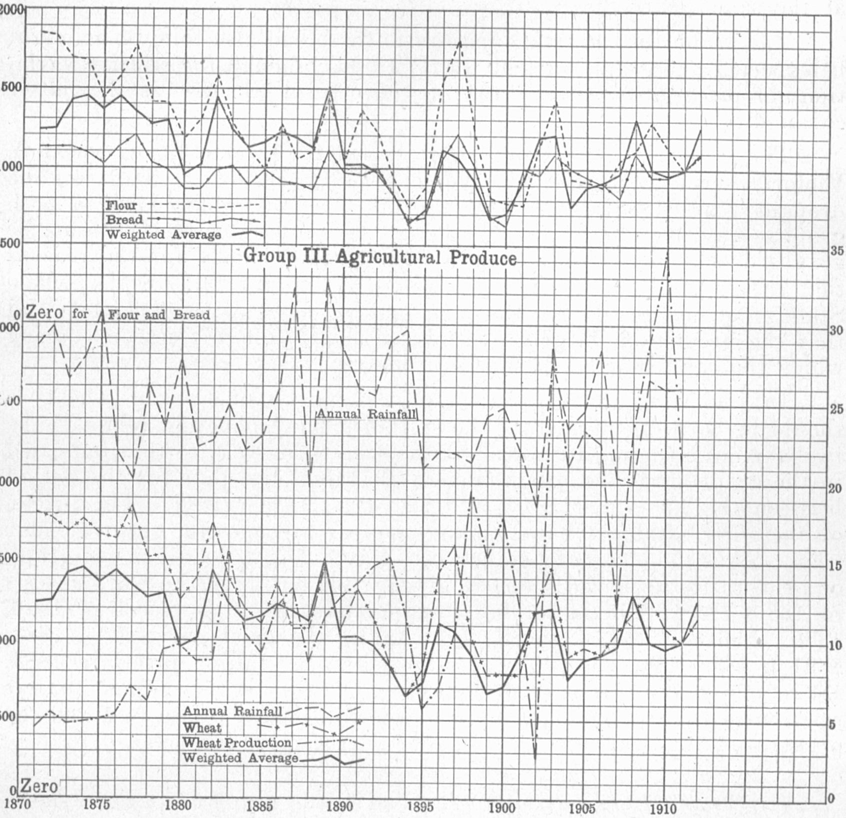
| YEAR. | Victorian Mean Rain fall. Inches. | WHEAT. | | FLOUR. | BREAD. RETAIL. | OATS. | HAY. | POTATOES. | Price Index for all Commodities in Group III. |
|---|---|---|---|---|---|---|---|---|---|
| | | Victorian Production. 000 bushels. | Price Ratio. | Price Ratio. | Price Ratio. | Price Ratio. | Price Ratio. | Price Ratio. | |
| 1871 .. | 28.56 | 4,501 | 1,806 | 1,861 | 1,121 | 1,460 | 1,046 | 617 | 1,236 |
| 1872 .. | 29.86 | 5,391 | 1,775 | 1,845 | 1,121 | 1,298 | 1,067 | 871 | 1,246 |
| 1873 .. | 26.40 | 4,752 | 1,686 | 1,702 | 1,121 | 1,805 | 1,350 | 746 | 1,422 |
| 1874 .. | 27.81 | 4,850 | 1,762 | 1,690 | 1,091 | 2,285 | 1,215 | 1,186 | 1,456 |
| 1875 .. | 30.86 | 4,979 | 1,667 | 1,438 | 1,020 | 1,671 | 1,202 | 1,218 | 1,361 |
| 1876 .. | 21.89 | 5,280 | 1,648 | 1,586 | 1,131 | 1,276 | 1,456 | 1,183 | 1,446 |
| 1877 .. | 20.11 | 7,018 | 1,850 | 1,791 | 1,201 | 1,572 | 1,164 | 1,028 | 1,347 |
| 1878 .. | 26.14 | 6,061 | 1,515 | 1,415 | 1,030 | 2,000 | 1,038 | 1,186 | 1,269 |
| 1879 .. | 23.46 | 9,399 | 1,543 | 1,409 | 990 | 1,373 | 1,207 | 1,331 | 1,298 |
| 1880 .. | 27.61 | 9,727 | 1,241 | 1,176 | 860 | 932 | 890 | 568 | 954 |
| 1881 .. | 22.25 | 8,714 | 1,397 | 1,300 | 860 | 1,267 | 844 | 736 | 1,012 |
| 1882 .. | 22.68 | 8,751 | 1,745 | 1,593 | 990 | 1,636 | 1,305 | 1,142 | 1,444 |
| 1883 .. | 24.90 | 15,570 | 1,399 | 1,276 | 1,010 | 1,311 | 1,223 | 785 | 1,237 |
| 1884 .. | 22.09 | 10,433 | 1,203 | 1,109 | 899 | 1,285 | 1,055 | 935 | 1,124 |
| 1885 .. | 22.95 | 9,170 | 1,108 | 993 | 990 | 1,195 | 1,206 | 776 | 1,156 |
| 1886 .. | 25.84 | 12,100 | 1,365 | 1,269 | 919 | 1,193 | 1,211 | 886 | 1,222 |
| 1887 .. | 32.32 | 13,329 | 1,075 | 1,055 | 909 | 1,099 | 1,278 | 762 | 1,184 |
| 1888 .. | 19.70 | 8,648 | 1,077 | 1,101 | 869 | 1,223 | 1,143 | 868 | 1,123 |
| 1889 .. | 32.77 | 11,496 | 1,472 | 1,437 | 1,111 | 1,524 | 1,578 | 1,310 | 1,505 |
| 1890 .. | 28.51 | 12,751 | 1,068 | 1,053 | 970 | 1,112 | 966 | 995 | 1,022 |
| 1891 .. | 25.90 | 13,679 | 1,331 | 1,362 | 959 | 1,022 | 928 | 726 | 1,024 |
| 1892 .. | 25.46 | 14,815 | 1,139 | 1,214 | 990 | 910 | 920 | 661 | 971 |
| 1893 .. | 28.99 | 15,255 | 859 | 939 | 836 | 772 | 742 | 1,089 | 834 |
| 1894 .. | 29.69 | 11,446 | 649 | 742 | 656 | 695 | 574 | 592 | 644 |
| 1895 .. | 20.88 | 5,669 | 818 | 886 | 677 | 708 | 698 | 364 | 734 |
| 1896 .. | 22.03 | 7,091 | 1,436 | 1,553 | 1,060 | 1,263 | 941 | 982 | 1,116 |
| 1897 .. | 21.94 | 10,580 | 1,612 | 1,802 | 1,212 | 919 | 852 | 718 | 1,063 |
| 1898 .. | 21.30 | 19,581 | 1,043 | 1,227 | 1,020 | 844 | 700 | 1,988 | 920 |
| 1899 .. | 24.22 | 15,238 | 787 | 812 | 687 | 703 | 575 | 514 | 670 |
| 1900 .. | 24.79 | 17,847 | 793 | 778 | 626 | 945 | 605 | 631 | 703 |
| 1901 .. | 22.05 | 12,127 | 787 | 762 | 1,000 | 956 | 966 | 1,144 | 928 |
| 1902 .. | 18.55 | 2,569 | 1,219 | 1,144 | 956 | 1,326 | 1,128 | 1,254 | 1,192 |
| 1903 .. | 27.44 | 28,526 | 1,473 | 1,444 | 1,090 | 1,123 | 1,185 | 674 | 1,209 |
| 1904 .. | 23.49 | 21,092 | 902 | 942 | 1,000 | 773 | 726 | 512 | 754 |
| 1905 .. | 24.53 | 23,418 | 964 | 926 | 956 | 903 | 780 | 1,639 | 894 |
| 1906 .. | 28.49 | 22,618 | 917 | 890 | 909 | 1,132 | 797 | 1,517 | 916 |
| 1907 .. | 20.40 | 12,100 | 1,065 | 1,052 | 818 | 1,123 | 949 | 628 | 973 |
| 1908 .. | 20.02 | 23,346 | 1,183 | 1,117 | 1,090 | 1,228 | 1,392 | 1,077 | 1,312 |
| 1909 .. | 26.52 | 28,780 | 1,300 | 1,290 | 956 | 930 | 865 | 940 | 1,000 |
| 1910 .. | 25.96† | 34,813 | 1,095 | 1,127 | 956 | 1,009 | 882 | 1,221 | 969 |
| **1911** .. | **26.00** | **20,892** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** |
| 1912* .. | — | — | 1,151 | 1,093 | 1,098 | 1,372 | 1,192 | 1,953 | 1,263 |

* First nine months 1912. † Approximate.

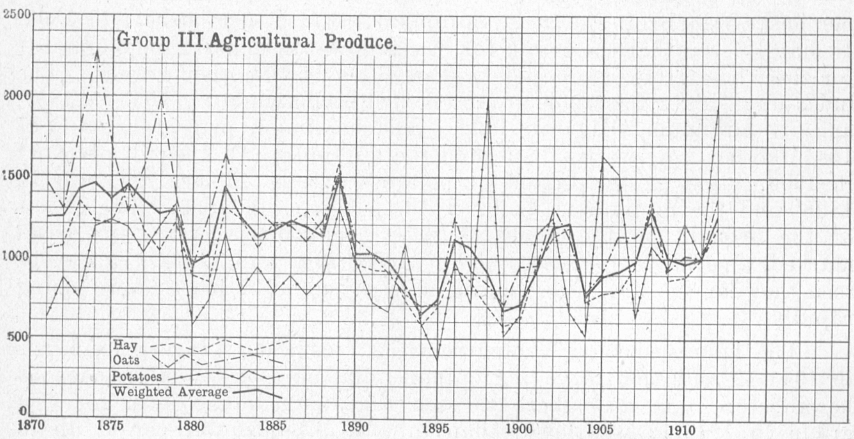
(i.) *Wheat, Flour and Bread.*—These figures may be more readily understood by reference to the graphs given on the next page. The former of these graphs shews, firstly, the price-ratios for flour and bread, together with the price-index for the whole group; secondly, the mean annual rainfall in Victoria; and thirdly, the price-ratio for wheat and the annual production of wheat in Victoria, which are again shewn in relation to the price-index for the whole group.

A glance at these graphs will suffice to shew, firstly, that the price-ratios for wheat and flour follow each other closely, and secondly that the prices of wheat and flour have a predominant effect on the price-index of the whole group. The general contour of the price-index for

MELBOURNE WHOLESALE PRICES, 1871 TO 1912.*—AGRICULTURAL PRODUCE (GROUP III.). PRICE-RATIOS FOR FLOUR, BREAD AND WHEAT, PRICE-INDEX FOR WHOLE GROUP, AVERAGE ANNUAL RAINFALL, AND PRODUCTION OF WHEAT.




AGRICULTURAL PRODUCE (GROUP III.), PRICE-RATIOS FOR HAY, OATS, AND POTATOES, AND PRICE-INDEX FOR WHOLE GROUP.




* Average for first nine months only of year 1912.

the group is the same as that of the price-ratios of wheat and flour, and further the "peaks" and "depressions" in all these three graphs occur at the same years.

The graph for the retail price-ratio for bread also follows, as might be expected, the graph for flour fairly closely, though the relative variations in price are not so great in the case of former as the latter commodity.

The graphs of the annual rainfall and the production of wheat in Victoria serve to shew the relation between the two. Thus in the drought years 1888, 1895, 1902 and 1907-8 the sudden falls in both graphs may be observed. It should be noticed, however, that the graphs do not always follow each other closely, chiefly for the reasons that the rainfall figures shew the mean annual rainfall for the whole State (and not merely for the principal wheat growing districts), and that the production largely depends, of course, on the seasons during which the rain came, as well as on the area under crop.

In reviewing the graphs of prices and production of wheat it should be borne in mind that the statistics for production relate to the twelve months ending in March of the succeeding year to that indicated in the graph, thus the production in 1910 includes that for the period between the 1st April, 1910, and the 31st March, 1911. The prices, on the other hand, are based on the monthly averages for each calendar year. Thus the effect of bad harvests may not be reflected in the graph of price-ratios until the succeeding year; for example, the bad harvests in 1885, 1888, 1895 and 1902 correspond to the high prices in 1886, 1889, 1896 and 1903 respectively. Again, the good harvests in 1883, 1891-3, 1898-1900 and 1903 are reflected in the falling prices in 1884, 1891-4, 1899-1901 and 1904 respectively. Broadly speaking, similar relations exist between the graphs of rainfall, wheat production and the price-ratios for flour, and in a smaller degree those for bread.

(ii.) *Oats, Hay, and Potatoes.*—The second graph on page 58 shews the price-ratios for oats, hay and potatoes in relation to the price-index for the whole group. In each case the price in 1911 is taken as the base (= 1000), as before. The price of oats was at its maximum (5/5⅛d. per bushel) in 1874, and at its minimum (1/7⅞d. per bushel) in 1894. It may be seen that the graph for hay follows the general index-number for the whole group more closely than either of the other graphs. The index-number for the whole group reached its maximum (1505) in 1889. and its minimum (644) in 1894. The maximum price for hay (£7 15s. 10d. per ton) was in 1889, and the minimum (£2 16s. 8d. per ton) in 1894, while the maximum for potatoes (£8 0s. 4d. per ton) was in 1898, and the minimum (£1 9s. 4½d. per ton) in 1895. The effects of the drought on the prices of these commodities is in some cases marked, especially, for example, in 1888, 1902 and 1908. It may be seen that for the first nine months of the year 1912 prices were rising rapidly.

The figures shewing comparisons between the average price levels in 1911-12 and each preceding quinquennial may be found on page 53 hereinbefore. It may there be seen that the average level for this group in 1911-12 was lower than in any quinquennial period up to 1890, but was higher than in any succeeding period.

9. **Dairy Produce (Group IV.)**—Although this group is not so important as the preceding one, the expenditure thereon amounting to only 8 per cent. of the total expenditure on all groups, it includes in all seven commodities of which some are of every day use, *e.g.,* butter, bacon and eggs.

The general graph for the group (see p. 49) shews that although the fluctuations are not so marked as in the preceding group (agricultural produce), there is a considerable similarity between the two graphs, thus the peaks in 1876, 1882, 1902, 1908 and 1912, and the depressions in 1880 and 1894 may be seen in both graphs. This similarity is due mainly to the fact that the prices in both groups are largely affected by the seasonal and meteorological conditions. It will be seen that the price-index for the whole group rose steadily from 1871 to 1876, when it reached its maximum (1415), then it fell until 1880 (except for a slight rise in recovery in 1879). The lowest point (708) was touched in 1894, and since then there have been four peaks in 1898, 1902, 1908 and 1912 (corresponding with the drought years), and three depressions in 1899, 1904 and 1911.

The price-index in 1912 (first nine months) is the highest since 1886.

**Melbourne Wholesale Prices, 1871–1912.**

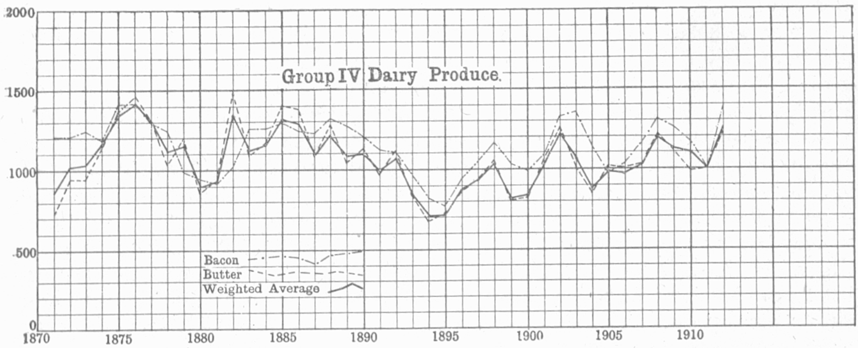
PRICE RATIOS FOR BACON AND BUTTER, AND PRICE-INDEX FOR WHOLE GROUP IV.

| YEAR. | Bacon. | Butter. | Group IV. | YEAR. | Bacon. | Butter. | Group IV. |
|---|---|---|---|---|---|---|---|
| 1871 .. .. | 1,205 | 721 | 864 | 1891 | 1,121 | 973 | 995 |
| 1872 .. .. | 1,205 | 945 | 1,019 | 1892 | 1,103 | 1,115 | 1,066 |
| 1873 .. .. | 1,243 | 945 | 1,032 | 1893 | 963 | 831 | 842 |
| 1874 .. .. | 1,186 | 1,136 | 1,160 | 1894 | 822 | 672 | 708 |
| 1875 .. .. | 1,411 | 1,366 | 1,345 | 1895 | 766 | 721 | 712 |
| 1876 .. .. | 1,420 | 1,464 | 1,415 | 1896 | 944 | 863 | 875 |
| 1877 .. .. | 1,299 | 1,311 | 1,303 | 1897 | 1,047 | 940 | 937 |
| 1878 .. .. | 1,243 | 1,027 | 1,112 | 1898 | 1,168 | 1,054 | 1,034 |
| 1879 .. .. | 990 | 1,197 | 1,146 | 1899 | 1,028 | 803 | 814 |
| 1880 .. .. | 944 | 852 | 900 | 1900 | 990 | 820 | 838 |
| 1881 .. .. | 916 | 940 | 935 | 1901 | 1,084 | 1,060 | 1,029 |
| 1882 .. .. | 1,019 | 1,486 | 1,347 | 1902 | 1,327 | 1,258 | 1,215 |
| 1883 .. .. | 1,252 | 1,087 | 1,114 | 1903 | 1,355 | 1,005 | 1,059 |
| 1884 .. .. | 1,252 | 1,161 | 1,156 | 1904 | 1,140 | 841 | 876 |
| 1885 .. .. | 1,290 | 1,404 | 1,316 | 1905 | 972 | 1,016 | 980 |
| 1886 .. .. | 1,234 | 1,382 | 1,286 | 1906 | 1,028 | 1,005 | 972 |
| 1887 .. .. | 1,224 | 1,082 | 1,091 | 1907 | 1,159 | 1,027 | 1,020 |
| 1888 .. .. | 1,318 | 1,279 | 1,210 | 1908 | 1,308 | 1,213 | 1,198 |
| 1889 .. .. | 1,271 | 1,038 | 1,082 | 1909 | 1,261 | 1,109 | 1,119 |
| 1890 .. .. | 1,205 | 1,126 | 1,099 | 1910 | 1,168 | 989 | 1,100 |
| .. .. | .. | .. | .. | **1911** | **1,000** | **1,000** | **1,000** |
| .. .. | .. | .. | .. | 1912* | 1,392 | 1,235 | 1,248 |

* For first nine months only.

The price ratios of bacon follow fairly closely the weighted average for the whole group, with the exception of the period 1871 to 1874, when the price of bacon remained fairly stationary, whereas the group index-number rose. The highest price for bacon was in 1876 (9½d. per lb.) and the lowest in 1895 (5⅛d. per lb.). The average price in the first nine months of 1912 was higher than for any year since 1876. The above figures are shewn in the following graphs:—

MELBOURNE WHOLESALE PRICES, 1871 to 1912*.—DAIRY PRODUCE (GROUP IV.). GRAPH SHEWING PRICE-RATIOS FOR BACON AND BUTTER AND PRICE-INDEX FOR THE WHOLE GROUP.




* Average for first nine months only of year 1912.

The graph for butter also closely follows that for the whole group, and the comments made on the general graph apply equally well to the price-ratios for butter. The highest price for butter (1s. 4¾d. per lb.) was in 1876, and the lowest (7¾d. per lb.) in 1894. The average price of butter was slightly higher in 1902 than the average for the first nine months of 1912, but with this exception the price in 1912 was higher than at any period since 1888.

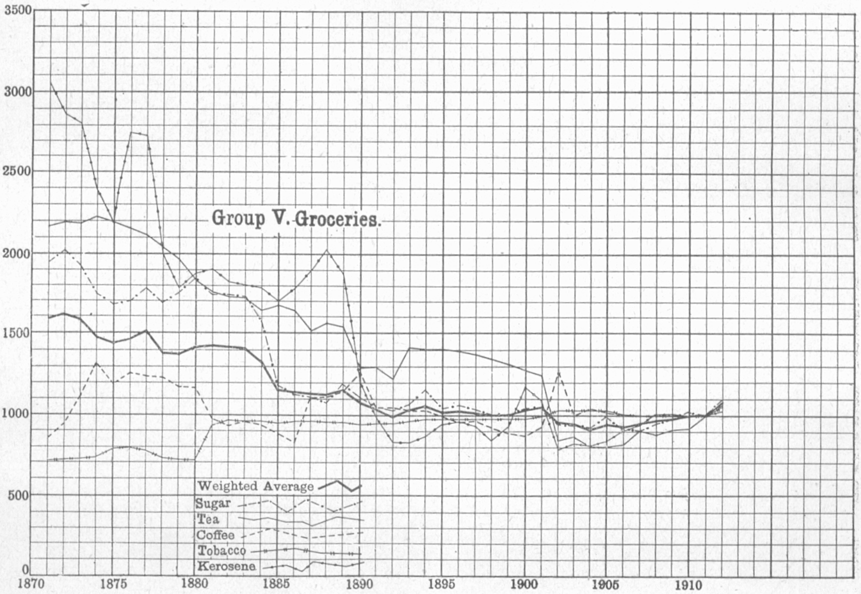
The prices of butter and of cheese fluctuate with the seasons, dry years shewing increases and good seasons decreases, but in addition to this, in the earlier years of this investigation they were affected by outside conditions, as during the whole period from 1871 to 1912, Victoria has changed from being a large importer of butter and cheese to becoming a large exporter.

From the price-indexes given on page 53 for 1911-12 compared with each quinquennial period as base it may be seen that prices in 1911-12 were higher than in 1871-5, but were lower than in either of the next three quinquennial periods. In the following period prices rose rapidly, and prices in 1911-12 were 29.9 per cent. higher than in 1891-5. They were also higher in these two years than in any of the three preceding periods.

10. **Groceries (Group V.)**—This group includes 21 articles, practically the whole of which were imported during the earlier part of the period under review. In more recent years, however, several of these commodities have been manufactured in the Commonwealth. The prices are all based on quotations with the duty paid, and it should be noted that the chief alterations in the Customs Tariff were made in the years 1880, 1894, 1901 and 1907.

The general graph of this group (see p. 62) shews that there was a fairly steady fall in price-ratios from 1871 until 1892, the maximum level (1608) occurring in 1872. From 1893 to 1901 prices remained fairly constant. They fell from 1902 until 1904, reaching their minimum (916) in the latter year. They rose gradually from 1904 until 1911 and more rapidly in 1912.

MELBOURNE WHOLESALE PRICES, 1871 to 1912.—GROCERIES (GROUP V.). GRAPH SHEWING PRICE RATIOS FOR SUGAR, TEA, COFFEE, TOBACCO AND KEROSENE AND PRICE-INDEX FOR WHOLE GROUP V.




The price of sugar fell from its highest price in 1872 (£44 2s. 4d. per ton) until 1875; it then rose for two years, but fell again in 1878. A rise in price then took place until 1880, after which prices fell persistently until 1885, with a sharp drop in 1884 and 1885. From 1886 until 1907 the fall was gradual and fairly consistent, the minimum being reached in 1907 (£19 15s. 4d. per ton). Since that year prices have risen.

The price of tea rose slightly from 1871 to 1874, when it was at its maximum price (1s. 8d. per lb.). Until 1892 it fell steadily, but this fall was checked by a slight rise in 1893 and 1894; it again fell slowly until 1901, and there was a considerable decline in 1902. The minimum price was reached in 1904 and 1905 (7¼d. per lb.), since which year the price has been steadily rising.

The price of coffee rose from 1871 to 1874, when the maximum price (1s. 5⅞d. per lb.) was reached. It then fell away until 1886, when the minimum (11⅛d. per lb.) was touched. From 1887 to 1890 a gradual rise took place, followed by a fall until 1900. From 1903 to 1911 prices were steady, but in 1912 there was again a sharp rise.

The price of tobacco in bond has remained practically level during the period under review, the only fluctuation of importance occurring in 1881, when the duty was raised 1s. per lb. In 1912 there was a rise of about 5 per cent.

There was a heavy fall in the price of kerosene from its maximum in 1871 (2s. 6d. per gallon) to its minimum (7¾d. per gallon) in 1902. Reference to the table on page 63 will shew that there were fairly sharp rises in 1906 and 1908. In 1912 the price increased by 2.6 per cent. on the previous year.

The price-indexes for this group with each quinquennial period as base (see page 53) shew that prices in 1911-12 were lower than in any period up to 1890, but were higher than in any of the succeeding periods.

## Melbourne Wholesale Prices, 1871 to 1912.

PRICE RATIOS FOR SUGAR, TEA, COFFEE, TOBACCO AND KEROSENE, AND PRICE-INDEX FOR WHOLE GROUP V.

| YEAR. | Sugar. | Tea. | Coffee. | Tobacco. | Kerosene. | Group V. |
|---|---|---|---|---|---|---|
| 1871 .. .. | 1,947 | 2,166 | 842 | 709 | 3,057 | 1,586 |
| 1872 .. .. | 2,016 | 2,194 | 940 | 715 | 2,866 | 1,608 |
| 1873 .. .. | 1,927 | 2,187 | 1,101 | 722 | 2,809 | 1,581 |
| 1874 .. .. | 1,744 | 2,222 | 1,319 | 723 | 2,395 | 1,476 |
| 1875 .. .. | 1,674 | 2,194 | 1,194 | 785 | 2,178 | 1,435 |
| 1876 .. .. | 1,698 | 2,159 | 1,254 | 790 | 2,752 | 1,462 |
| 1877 .. .. | 1,784 | 2,111 | 1,241 | 778 | 2,738 | 1,502 |
| 1878 .. .. | 1,685 | 2,035 | 1,231 | 726 | 2,000 | 1,378 |
| 1879 .. .. | 1,746 | 1,965 | 1,176 | 716 | 1,783 | 1,371 |
| 1880 .. .. | 1,842 | 1,833 | 1,167 | 714 | 1,879 | 1,412 |
| 1881 .. .. | 1,737 | 1,756 | 977 | 930 | 1,902 | 1,421 |
| 1882 .. .. | 1,737 | 1,729 | 930 | 963 | 1,822 | 1,414 |
| 1883 .. .. | 1,726 | 1,722 | 958 | 959 | 1,803 | 1,408 |
| 1884 .. .. | 1,562 | 1,639 | 935 | 959 | 1,783 | 1,326 |
| 1885 .. .. | 1,185 | 1,673 | 884 | 950 | 1,700 | 1,158 |
| 1886 .. .. | 1,130 | 1,639 | 824 | 959 | 1,783 | 1,139 |
| 1887 .. .. | 1,110 | 1,507 | 1,106 | 959 | 1,896 | 1,128 |
| 1888 .. .. | 1,076 | 1,555 | 1,111 | 955 | 2,025 | 1,222 |
| 1889 .. .. | 1,190 | 1,535 | 1,148 | 955 | 1,873 | 1,152 |
| 1890 .. .. | 1,107 | 1,292 | 1,264 | 944 | 1,210 | 1,074 |
| 1891 .. .. | 1,048 | 1,298 | 1,046 | 950 | 993 | 1,032 |
| 1892 .. .. | 1,028 | 1,229 | 1,046 | 952 | 828 | 997 |
| 1893 .. .. | 1,064 | 1,417 | 1,032 | 966 | 828 | 1,033 |
| 1894 .. .. | 1,154 | 1,403 | 1,032 | 977 | 866 | 1,057 |
| 1895 .. .. | 1,038 | 1,403 | 995 | 977 | 943 | 1,016 |
| 1896 .. .. | 1,063 | 1,396 | 954 | 977 | 962 | 1,021 |
| 1897 .. .. | 1,037 | 1,375 | 963 | 977 | 930 | 1,009 |
| 1898 .. .. | 1,005 | 1,347 | 921 | 977 | 841 | 1,000 |
| 1899 .. .. | 1,005 | 1,312 | 889 | 977 | 930 | 1,003 |
| 1900 .. .. | 1,034 | 1,277 | 870 | 977 | 1,171 | 1,039 |
| 1901 .. .. | 1,045 | 1,243 | 921 | 998 | 1,089 | 1,048 |
| 1902 .. .. | 941 | 837 | 1,264 | 1,032 | 783 | 945 |
| 1903 .. .. | 933 | 861 | 1,000 | 1,032 | 828 | 936 |
| 1904 .. .. | 920 | 805 | 1,041 | 1,032 | 809 | 916 |
| 1905 .. .. | 994 | 805 | 1,018 | 1,032 | 834 | 942 |
| 1906 .. .. | 918 | 819 | 1,000 | 1,012 | 904 | 923 |
| 1907 .. .. | 903 | 903 | 1,000 | 1,000 | 943 | 948 |
| 1908 .. .. | 945 | 882 | 1,000 | 1,000 | 1,006 | 968 |
| 1909 .. .. | 975 | 910 | 1,000 | 1,000 | 1,006 | 978 |
| 1910 .. .. | 1,024 | 917 | 1,000 | 1,000 | 1,000 | 999 |
| **1911 .. ..** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** |
| 1912* .. .. | 1,098 | † | 1,074 | 1,054 | 1,026 | ‡1,085 |

* First nine months only. † Price not available. ‡ Omitting Tea.

11. **Meat** (**Group VI.**)—This group includes five kinds of meat. The figures are continuous since the year 1890, and particulars for 1884 and 1885 have also been included. Reliable and comparable records as to the wholesale prices of meat for other years are not available.

Referring to the graph on page 65, it will be seen that price-index for the whole group fell from 1890 to 1895, when the minimum (682) was reached. The price level then rose until 1902, with the exception of a small decline in 1899. The maximum level (1447) was reached in 1902, a year of severe drought. There was but little change during 1903 and 1904, but prices again fell during 1905 and 1906, and then rose during 1907 and 1908, only to fall again until 1911. In 1912 a sharp rise took place, especially during the third quarter of that year.

**Melbourne Wholesale Prices, 1884, 1885, and 1900 to 1912.**

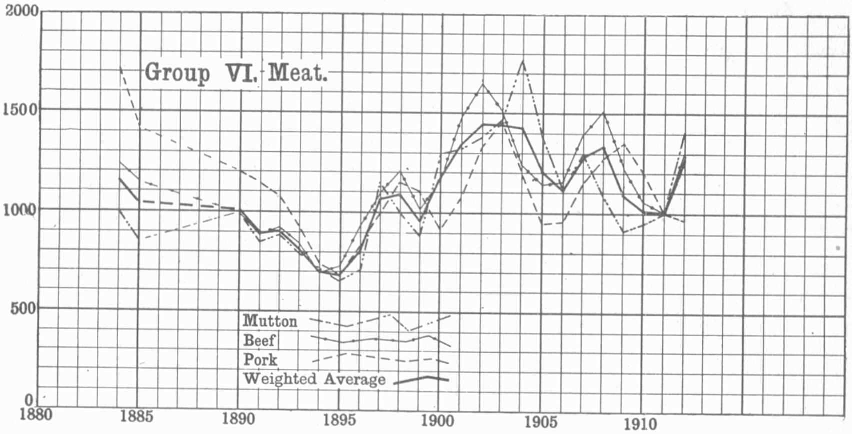
PRICE-RATIOS FOR BEEF, MUTTON AND PORK, AND PRICE-INDEX FOR WHOLE GROUP VI.

| YEAR. | Beef. | Mutton. | Pork. | Group VI. |
|---|---|---|---|---|
| 1884 .. .. .. | 1,238 | 1,000 | 1,714 | 1,151 |
| 1885 .. .. .. | 1,148 | 853 | 1,414 | 1,042 |
| 1890 .. .. .. | 984 | 1,000 | 1,200 | 1,007 |
| 1891 .. .. .. | 882 | 853 | 1,143 | 888 |
| 1892 .. .. .. | 919 | 882 | 1,071 | 901 |
| 1893 .. .. .. | 846 | 794 | 928 | 816 |
| 1894 .. .. .. | 693 | 706 | 743 | 695 |
| 1895 .. .. .. | 721 | 647 | 686 | 682 |
| 1896 .. .. .. | 931 | 706 | 828 | 808 |
| 1897 .. .. .. | 1,095 | 1,147 | 1,000 | 1,072 |
| 1898 .. .. .. | 1,207 | 1,000 | 1,143 | 1,091 |
| 1899 .. .. .. | 1,016 | 882 | 1,100 | 960 |
| 1900 .. .. .. | 1,153 | 1,298 | 914 | 1,168 |
| 1901 .. .. .. | 1,482 | 1,323 | 1,071 | 1,345 |
| 1902 .. .. .. | 1,651 | 1,382 | 1,328 | 1,447 |
| 1903 .. .. .. | 1,510 | 1,470 | 1,457 | 1,443 |
| 1904 .. .. .. | 1,238 | 1,765 | 1,214 | 1,427 |
| 1905 .. .. .. | 1,139 | 1,382 | 943 | 1,209 |
| 1906 .. .. .. | 1,149 | 1,118 | 957 | 1,110 |
| 1907 .. .. .. | 1,396 | 1,298 | 1,143 | 1,294 |
| 1908 .. .. .. | 1,503 | 1,088 | 1,271 | 1,335 |
| 1909 .. .. .. | 1,222 | 911 | 1,357 | 1,088 |
| 1910 .. .. .. | 1,051 | 941 | 1,200 | 1,008 |
| **1911** .. .. .. | **1,000** | **1,000** | **1,000** | **1,000** |
| 1912* .. .. .. | 1,301 | 1,412 | 971 | 1,291 |

* First nine months.

The wholesale price of beef fell from 1890 to 1894, when it reached its minimum (13s. 0¾d. per 100 lb.). It then rose steadily until 1898, and in 1899 it again fell. During the next three years it continued to rise, and attained its maximum in 1902 (31s. 1¼d. per 100 lb.). After this it fell till 1905, and rose again during 1907 and 1908. In 1909, 1910 and 1911 prices fell, but in 1912 a rise of 30 per cent. took place.

MELBOURNE WHOLESALE PRICES, 1884, 1885 and 1900 to 1912.*—MEAT (GROUP VI.) GRAPH SHEWING PRICE-RATIOS FOR BEEF, MUTTON AND PORK, AND PRICE-INDEX FOR WHOLE GROUP VI.




* Average of first nine months only of year 1912.

The price of mutton fell from 1890 to 1895, when it reached its minimum (1⅜d. per lb.). During the next two years it rose and then fell for another two years until 1899, when a pronounced rise took place, culminating in 1904 in a maximum price of 3¾d. per lb. It is interesting to note that while beef fell in price immediately after the drought in 1902, the price of mutton continued to rise until 1904. With the exception of an increase in 1907, the price of mutton fell from 1904 until 1909, then commenced to rise, and in 1912 a large increase, amounting to over 41 per cent., took place.

The price of pork has fluctuated greatly. During the period 1890 to 1912 there are three peaks, viz., in 1898, 1903, when the maximum (6⅜d. per lb.) was reached, and 1909, and three depressions, viz., in 1895 (minimum price 3d. per lb.), 1900, and 1905. In contradistinction to other meats, the price of pork fell in 1912.

In the table on page 53, shewing the index-numbers for 1911-12 compared with preceding quinquennial periods as bases, it may be seen that the average level in 1911-12 was higher than in either of the two first quinquennial periods, but lower than in the two other periods.

12. **Building Material (Group VII.).**—This group comprises nine articles. The graph (see page 49) shews that the price-index for the group rose rapidly in 1872 and 1873, reaching the maximum (1446) in the latter year. The minimum level (704) was touched in 1892, and from that year onward until 1912 a fairly steady rise took place.

The price-indexes for 1911-12, taking each preceding quinquennial period as base (see p. 53), shews that prices were lower in 1911-12 than in 1871-5, but were higher in these two years than in any other period.

13. **Chemicals (Group VIII.)**—Four articles are included in this group, the price-index for which shews that after a rise in 1872 and 1873 the maximum (1454) was reached in the latter year. Prices then began to fall, and, with the exception of recoveries in 1880, 1890 and 1896, continued to decline until 1909, when the minimum (815) was reached. Prices recovered again in 1910 and 1911, but fell in 1912. This is the only one of the eight groups which shews a fall in prices for 1912 (see graph on page 49).

The table on page 53 shews that in spite of the fall which occurred in 1912, the average price level for 1911-12 was higher than in either of the three preceding quinquennial periods.

## IV.—IMPORT AND EXPORT INDEX NUMBERS.

1. **General.** —Retail and wholesale prices having been dealt with in Sections II. and III. respectively of this Report, the question of import and export values now remains to be investigated. The data upon which the index-numbers given in this part of the Report are based have generally been computed by dividing the total *value* of the imports or exports, as the case may be, in any particular year of each commodity included in the investigation, by the total *quantity* imported or exported in the same year. The data thus obtained are, therefore, of the nature of average values rather than prices. They refer to all grades or qualities included in the imports and exports and not to any special grade or quality, as in the case of retail and wholesale prices.

The average import values have generally been taken for those commodities which are either wholly or mainly imported into Australia, such as tea, cotton and kerosene; while for commodities which are largely produced in Australia, such as wheat, meat, butter and hides, export values have generally been taken. In regard, however, to coal, the imports and exports of which are comparatively small in relation to the local consumption, the average value at the pit's mouth has been taken, while for raw sugar, a commodity which is largely produced in Australia, the average import values have been selected in view of the incomplete nature of the returns available as to the value of the local production.

2. **Scope of Investigation.**—The values have been computed from the import and export values for the whole Commonwealth, as obtained from the Trade and Customs returns. These returns were first compiled and published as a whole for all the States on a uniform basis in the year 1903. In order to furnish the index-numbers for the whole of the Commonwealth period (since 1901) special investigations were made to secure the values based on the imports and exports for the whole Commonwealth for the two years (1901 and 1902) immediately preceding the year for which the classified returns were first available. In a few cases where the returns for the several States could not be satisfactorily co-ordinated for these years, values based on the trade of Victoria alone have been taken.

Owing to the difficulty in securing reliable data for the whole Commonwealth, and to the large amount of work involved, the investigation has not for the present been pursued for years prior to 1901.

**3. Commodities Included.**—Broadly speaking, the list and classification of commodities adopted in the computation of the British Board of Trade index-number have been followed in the present investigation. The forty-four commodities have been classified into six groups, as follow:—

| | | |
|---|---|---|
| I. *Metals and Coal.* | Number of Commodities | 5 |
| II. *Textiles.* | ,, ,, | 4 |
| III. *Agricultural Produce.* | ,, ,, | 7 |
| IV. *Meat, Dairy Produce, etc.* | ,, ,, | 7 |
| V. *Groceries, etc.* | ,, ,, | 14 |
| VI. *Miscellaneous.* | ,, ,, | 17 |

The commodities included in each group are specified in the tabular statement given below.

**4. Mass-Units and Sources of Information.**—The method adopted in the computation of the index-numbers in this investigation is the same as used in regard to the retail and wholesale price index-numbers, viz., the "aggregate expenditure" method.

The subjoined tabular statement shews the commodities included in each group, the "mass-units" (representing the relative usage of each commodity, and thus constituting what has been called the "regimen"), the units of measurement and the source from which the data have been obtained. In regard to the last item where the word "Imports" or "Exports" is shewn, it is to be understood that the average values have been computed from the Trade and Customs returns for the whole Commonwealth except in the few instances referred to in paragraph 2 hereof.

**Commonwealth Import and Export Index-Numbers, List of Commodities included, Mass-Units, Units of Measurement, and Sources of Information.**

| Commodity. | Mass-Unit. (0,000 omitted.) | Unit of Measurement. | Sources of Information. |
|---|---|---|---|
| GROUP I.—METALS AND COAL (5 COMMODITIES). | | | |
| Coal .. .. .. | 600 | ton | Value (at pit's mouth) of Commonwealth Production. |
| Iron, pig .. .. | 28 | ,, | Imports. |
| Copper, ingots .. | 9 | ,, | Exports. |
| Tin, ingots .. .. | ¼ | ,, | ,, |
| Lead, pig .. .. | 1¼ | ,, | ,, |
| GROUP II.—TEXTILES (4 COMMODITIES). | | | |
| Cotton, raw .. .. | 24,000 | lb. | Imports. |
| Wool .. .. .. | 12,200 | ,, | Exports. |
| Jute, raw .. .. | 40 | cwt | Imports. |
| Flax and Hemp .. | 36 | ,, | ,, |

| Commodity. | Mass-Unit. (0,000 omitted.) | Unit of Measurement. | Sources of Information. |
|---|---|---|---|
| GROUP III.—AGRICULTURAL PRODUCE, ETC. (7 COMMODITIES). | | | |
| Wheat .. .. | 2,800 | bushel (60 lbs.) | Exports. |
| Barley .. .. | 250 | bushel (50 lbs.) | ,, |
| Oats .. .. .. | 1,300 | bushel (40 lbs.) | ,, |
| Maize .. .. .. | 1,000 | bushel (56 lbs.) | ,, |
| Hops .. .. .. | 120 | lb. | Imports. |
| Rice .. .. .. | 2 | ton | ,, |
| Potatoes .. .. | 40 | ,, | Exports. |
| GROUP IV.—MEAT, DAIRY PRODUCE, ETC. (7 COMMODITIES). | | | |
| Beef .. .. .. | 39,000 | lb. | Exports. |
| Mutton .. .. | 33,000 | ,, | ,, |
| Bacon .. .. .. | 4,000 | ,, | ,, |
| Butter .. .. | 9,500 | ,, | ,, |
| Cheese .. .. | 1,500 | ,, | ,, |
| Eggs .. .. .. | 1,800 | dozen | ,, |
| Fish (tinned) .. | 2,400 | lb. | Imports. |
| GROUP V.—GROCERIES, ETC. (7 COMMODITIES). | | | |
| Sugar, raw .. .. | 22 | ton | Imports |
| Tea .. .. .. | 3,000 | lb. | ,, |
| Coffee .. .. .. | 200 | ,, | ,, |
| Cocoa .. .. .. | 100 | ,, | ,, |
| Rum .. .. .. | 30 | gallons | ,, |
| Wine .. .. .. | 450 | ,, | Exports. |
| Tobacco .. .. | 1,300 | lb. | Imports. |
| GROUP VI.—MISCELLANEOUS (14 COMMODITIES). | | | |
| Linseed .. .. | 1 | cental | Imports |
| Olive Oil .. .. | 4 | gallon | ,, |
| Cocoanut Oil .. | 150 | ,, | ,, |
| Kerosene .. .. | 1,700 | ,, | ,, |
| Slates .. .. .. | $\frac{1}{2}$ | 1,000 | ,, |
| Timber .. .. | 620 | 100 sup. ft. | ,, |
| Hides .. .. .. | 120 | each | Exports. |
| Tallow .. .. | 35 | cwt. | ,, |
| Salt .. .. .. | 7 | ton | Imports. |
| Carbonate of Soda .. | 7 | cwt. | ,, |
| Caustic Soda .. | $\frac{3}{4}$ | ,, | ,, |
| Saltpetre .. .. | 1 | ,, | ,, |
| Sulphur .. .. | 5 | ,, | ,, |
| Nitrate of Soda .. | 4 | ,, | ,, |

5. **Index-Numbers and Graphs.**—The index-numbers for each group and the weighted averages for the three groups relating to food and groceries (Groups III., IV. and V.) and for all groups combined are shewn in the following table. As before, the index-numbers have been computed with the relative expenditure in 1911 as base (= 1000), that is to say the figures for the earlier years represent the amount, which would have to be expended in each year specified, in order to purchase the several relative quantities (indicated by the mass-units) of each commodity, which quantities would in 1911 have cost 1000 units.

**Commonwealth Import and Export Values. Index–Numbers for each Group, for Groups III., IV. and V., and all Groups combined.**

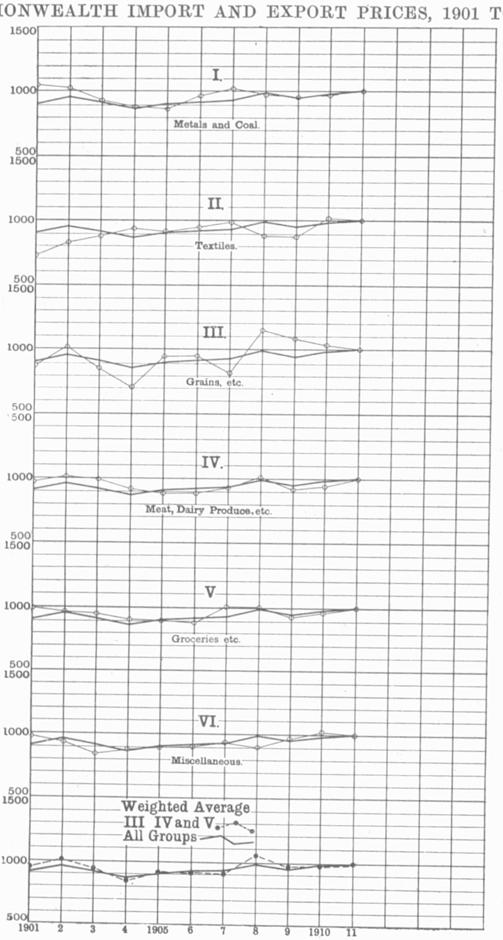
| YEAR. | I. Metals and Coal. | II. Textiles. | III. Agricultural Produce. | IV. Meat, Dairy Produce, etc. | V. Groceries, etc. | III., IV. and V. Food and Groceries.* | VI. Miscellaneous. | All Groups.* |
|---|---|---|---|---|---|---|---|---|
| 1901 .. | 1,046 | 730 | 884 | 978 | 994 | 949 | 979 | 911 |
| 1902 .. | 1,015 | 828 | 1,011 | 1,010 | 969 | 1,005 | 934 | 959 |
| 1903 .. | 931 | 885 | 863 | 993 | 956 | 943 | 842 | 918 |
| 1904 .. | 888 | 935 | 707 | 915 | 908 | 843 | 877 | 870 |
| 1905 .. | 867 | 915 | 950 | 888 | 902 | 912 | 899 | 907 |
| 1906 .. | 962 | 947 | 951 | 888 | 889 | 910 | 906 | 921 |
| 1907 .. | 1,017 | 987 | 823 | 929 | 1,005 | 905 | 937 | 935 |
| 1908 .. | 981 | 882 | 1,148 | 1,004 | 1,002 | 1,053 | 902 | 993 |
| 1909 .. | 958 | 879 | 1,081 | 914 | 937 | 974 | 970 | 952 |
| 1910 .. | 980 | 1,013 | 1,033 | 940 | 970 | 976 | 1,017 | 989 |
| **1911** .. | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** |

* Weighted Average.

(i.) *Reversibility of Index-Numbers.*—In view of the importance of the matter attention may again be drawn to the fact that index-numbers computed by the aggregate expenditure method adopted in this Report are strictly *reversible.* Thus, if it be desired to take any other year as base (= 1000) the arithmetical calculations can readily be made (see pp. 35 and 48 hereinbefore).

(ii.) *Graphs.*—The relative values of the above index-numbers may be more readily seen by reference to the following graphs.

COMMONWEALTH IMPORT AND EXPORT PRICES, 1901 TO 1911.



**6. General Results of Investigation.**—Reference to the graph given on page 69 shews that the index-number for all groups combined, after rising in 1902, declined in the next two years, reaching its minimum in 1904. During the following four years it steadily rose, and in 1908 the price level was nearly as high as in 1911. In 1909 prices fell, but rose again during the next two years, the maximum being reached in 1911. It should be observed that the high prices in 1902 and 1908 are almost entirely due to the droughts which occurred in these years, and which consequently increased prices in Groups III. (Agricultural Produce) and IV. (Meat, etc.). This is clearly shewn in the graphs.

The average price level for the five years, 1901 to 1905, is 913, and for the next five years (1905 to 1910) is 954, as compared with 1000 in the base year (1911). Reversing these numbers and taking successively the average for each period as base (= 1000) it is found that compared with the first period the index-number in 1911 is 1095 and with the second period is 1044. In other words, prices in 1911 were 9.5 per cent. higher than the average level during 1901 to 1905, and 4.4 per cent. higher than during 1906 to 1910. The following table gives similar information in regard to each group. That is to say, the first horizontal line gives the index-numbers for 1911 compared with the average prices during 1901 to 1905 as base (= 1000), and the second line shews the corresponding index-numbers with average prices in 1905 to 1910 as base:—

**Commonwealth Import and Export Index-Numbers for 1911, compared with each preceding Quinquennium as Base (= 1,000).**

INDEX-NUMBERS FOR 1911 FOR—

| BASES PERIOD. (Prices = 1,000.) | I. Metals and Coal. | II. Textiles. | III. Agricultural Produce. &c. | IV. Meat, Dairy Produce, &c. | V. Groceries, &c. | III., IV., and V* combined, Food and Groceries. | VI. Miscellaneous. | All Groups combined. |
|---|---|---|---|---|---|---|---|---|
| 1901–5 .. | 1,052 | 1,164 | 1,132 | 1,045 | 1,057 | 1,075 | 1,103 | 1,095 |
| 1906–10 .. | 1,042 | 1,062 | 993 | 1,069 | 1,041 | 1,038 | 1,056 | 1,044 |

* Weighted Average.

The above table shews that in every case, except Group III. (1906-10), the price-level was higher in 1911 than the average for either of the preceding quinquennial periods. Thus for all groups combined it may be seen that the index-number in 1911, taking the first period as base, was 1095, a rise of 9.5 per cent., and taking the second period as base, was 1044, or 4.4 per cent. higher.

Compared with the average for the years 1901-5 the increase in 1911 was most marked in Group II. (Textiles), followed by Groups III. (Agricultural Produce), VI. (Miscellaneous), V. (Groceries), I. (Metals and Coal), and IV. (Meat, etc.) in the order named. Compared with the next five years the increase in 1911 was greatest in Group IV. (Meat, etc.) and least in Group III. (Agricultural Produce).

# V.—COMPARISONS BETWEEN INDEX-NUMBERS IN AUSTRALIA.

1. **General.**—Any comparisons which can be made between the index-numbers given in the preceding pages are, owing to certain considerations, subject to qualification. In the first place it should be noticed that the import and export value index-numbers, and also the retail price (Cost of Living) index-numbers (except in the case of Sydney, and then only for a restricted list of commodities) are available for the Commonwealth period (since 1901) only. Secondly, the wholesale price index-numbers, although available since 1871, refer to Melbourne prices only. The only general comparison that can be made for any lengthy period is, therefore, between the Sydney retail price index-number and the Melbourne wholesale price index-number. The import and export value index-numbers, which relate to the whole Commonwealth, can be compared with these for the years 1901 to 1912.

For special purposes it may, of course, be essential that the index-numbers should relate to special groups or lists of commodities or services. For example, if it be desired to compare changes in import and export values of food and groceries with the wholesale and retail prices of the same class of commodities in Melbourne, reference would, of course, be made to the index-numbers for these special groups, and although such are not ordinarily necessary, specific questions may arise which demand such comparisons.

2. **Index-Numbers and Graphs.**—In the subjoined table comparisons are shewn between the following index-numbers:—

(i.) Import and export values for the whole Commonwealth, 1901 to 1911.

(ii.) Wholesale prices in Melbourne, 1901 to 1912.

(iii.) Retail prices and house rent in Melbourne, 1901 to 1912.

(iv.) Retail prices in Sydney, 1901 to 1912, based on a restricted list of only 18 commodities (the data being obtained from State Official publications).

(v.) Retail prices in Sydney, 1901 to 1912, based on prices of 46 commodities.

(vi.) Retail prices and house rent in Sydney, 1901 to 1912.

In addition, a special comparison is made between the index-numbers based on import and export values, and on wholesale and retail prices of food and groceries in Melbourne.

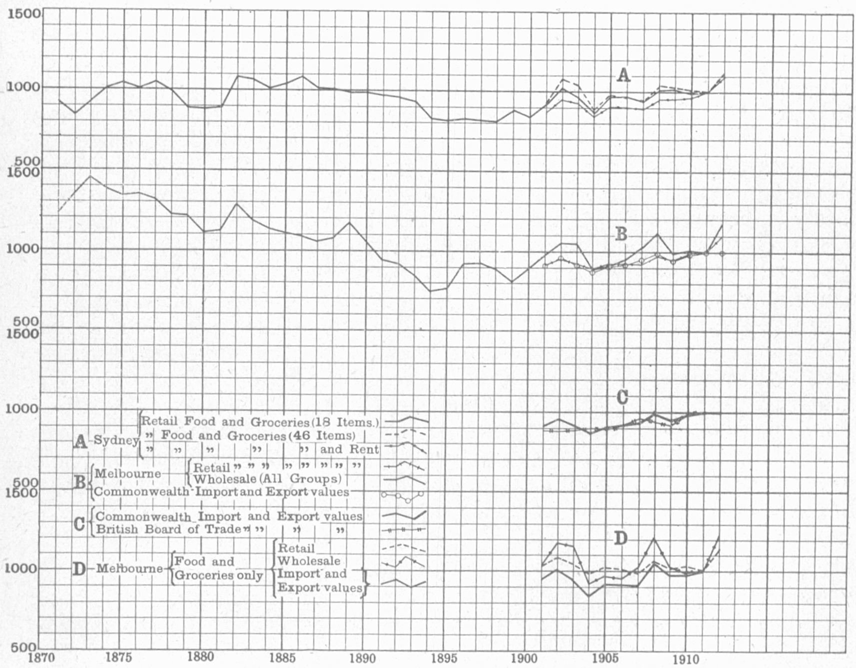
## Price-Indexes in Australia, Comparison between different Index-Numbers, 1901-1912

| YEAR. | Import and Export Values. | | Wholesale Prices in Melbourne. | | RETAIL PRICES. | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Melbourme. | | Sydney. | | |
| | All Groups. | Food & Groceries only. | All Groups. | Food & Groceries only. | All Groups. | Food & Groceries only. | All Groups. | Food & Groceries‡ (18 Commodities.)‡ | Food & Groceries (46 Commodities. |
| 1901 .. | 911 | 949 | 974 | 1,034 | 916 | 1,032 | 866 | 916 | 927 |
| 1902 .. | 959 | 1,005 | 1,051 | 1,176 | 951 | 1,085 | 950 | 1,023 | 1,078 |
| 1903 .. | 918 | 943 | 1,049 | 1,160 | 927 | 1,041 | 929 | 966 | 1,040 |
| 1904 .. | 870 | 843 | 890 | 914 | 899 | 980 | 846 | 868 | 886 |
| 1905 .. | 907 | 912 | 910 | 966 | 924 | 1,018 | 909 | 976 | 982 |
| 1906 .. | 921 | 910 | 948 | 956 | 924 | 1,010 | 906 | 976 | 974 |
| 1907 .. | 935 | 905 | 1,021 | 1,024 | 922 | 989 | 898 | 942 | 946 |
| 1908 .. | 993 | 1,053 | 1,115 | 1,218 | 976 | 1,064 | 956 | 1,010 | 1,041 |
| 1909 .. | 952 | 974 | 993 | 1,025 | 953 | 1,015 | 959 | 1,018 | 1,023 |
| 1910 .. | 989 | 976 | 1,003 | 988 | 992 | 1,026 | 965 | 997 | 1,011 |
| **1911** .. | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** |
| 1912* .. | † | † | 1,174 | 1,226 | 1,100 | 1,145 | 1,099 | † | 1,119 |

* First nine months only. † Not available. ‡ Computed from data published in State Official documents.

These index-numbers are shewn in the following graphs. The Melbourne wholesale price and the Sydney retail price index-numbers have been plotted as far back as 1871. The actual index-numbers prior to 1901 have been given on pages 48 and 40 respectively, and are not repeated in the above table.

PRICE-INDEXES, COMPARISONS BETWEEN INDEX-NUMBERS IN AUSTRALIA, 1871 TO 1912.



3. **General Comparisons.**—In making comparisons between these particular index-numbers, it is to be borne in mind that the figures do not, of course, directly indicate the relation between the different prices themselves, that is between wholesale and retail prices, etc.; what they shew is the relative increase or decrease in each set of price-indexes in relation to those of the basic year (1911). Though the retail price is of course higher than the wholesale, the index-number may for any year be greater for wholesale than for retail prices.

Comparing the first two graphs on page 72, the course of retail prices (in Sydney) is shewn in relation to wholesale prices (in Melbourne). The first noticeable feature is that in the early years, from 1871 to about 1891, the price-index was much higher for the wholesale than for the retail prices. Up to the year 1890-1, the wholesale price index-number was uniformly greater than 1000—that is, wholesale prices were higher than in 1911—whereas in the case of retail prices it may be seen that during several of the early years the index-number was less than 1000—that is, retail prices in these years were less than in 1911. Even during the early years there is, however, considerable similarity in the general trend of the two graphs, and this similarity is more marked during the latter half of the period under review. It may be seen, for example, that in both graphs prices were falling from 1877 to 1880, and that there was a sudden rise in 1882, followed by a general downward movement until 1894. Again, from 1900 to 1902 prices were rising, with a sudden fall in 1904.

Broadly speaking, it appears that the fluctuations in prices are more violent and more frequent in the case of wholesale than retail prices. This is, perhaps, more clearly seen by reference to graphs B or D, and by comparing, for the period 1901 to 1912, the Melbourne wholesale price-indexes with the Melbourne retail price-indexes. Graph B includes all groups (as well as house-rent in the retail price-indexes), while graph D refers to food and groceries only. In both cases it may be seen that the fluctuations are more marked in regard to wholesale than retail prices. The reasons for this difference, which has been observed to exist generally, and not merely in Australia, are not immediately apparent, and will be made the subject of further investigation by this Bureau. Quite a large number of explanations have been put forward. For example, it has been stated to be due to the fact that a variation in the wholesale price of a raw material may be substantial in itself, but yet may not be large enough to necessitate a change in the retail price of the manufactured commodity; that is to say, the cost of the labour element in the retail price of a commodity may be comparatively large, or, again, there may be a disinclination on the part of shopkeepers to vary prices until the urgent necessity therefor arises. It is stated, moreover, that retail dealers in certain branches of trade purchase their stock at contract or standard prices, which do not reflect all the movements in the prices of raw materials.

A reference to graph A will shew that the price-indexes, based on 18 commodities only, shewn by the continuous line, run in many places very close to those based on the 46 commodities shewn by the broken

line, though the former are generally too low. The lowest of the three lines in this graph shews the index-numbers not only for the 46 commodities, but the commodities together with the house rent. From this it may be seen that the inclusion of house-rent, which had uniformly increased during the twelve years 1901 to 1912, generally has the effect of making the graph more free from sudden change, and results in a greater increase in the cost of living in the later, as compared with the earlier, years.

Graph B, from 1901 to 1912, shews that there is a remarkably close agreement between the index-numbers computed from import and export values, and those based on retail prices and house rents in Melbourne. It shews, moreover, that *the increase in the cost of living has advanced at a greater rate than wholesale prices;* it is shewn below that *the greater rate of increase in cost of living is entirely due to house rent.* The average price-level for import and export values in 1901-5, as compared with 1911 (= 1000) was 913, as against 923 for retail prices and rent, and 975 for wholesale prices. The corresponding averages for the years 1906-10, as compared with 1911, were 958, 953, and 1016, respectively. During the years 1901 to 1912 at any rate, therefore, cost of living in Melbourne has closely followed the index-numbers based on import and export values, both having increased to a greater extent than wholesale prices.

That the increase in cost of living (retail prices and house rent) in Melbourne has been greater than the increase in Melbourne wholesale prices is shewn by the subjoined statement.

**Index-Numbers, shewing Comparison between Wholesale and Retail Prices in Melbourne, 1901 to 1912.***

| Particulars. | Wholesale Prices. | | Retail Prices, etc. | |
|---|---|---|---|---|
| | All Groups. | Groceries and Food only. | All Groups, including House Rent. | Groceries and Food only. |
| Average in 1901–5 .. | **1,000** | **1,000** | **1,000** | **1,000** |
| Index-Number for 1911-12 | 1,115 | 1,060 | 1,138 | 1,040 |
| Average in 1906-10 .. | **1,000** | **1,000** | **1,000** | **1,000** |
| Index-Number for 1911-12 | 1,070 | 1,068 | 1,102 | 1,050 |

* First nine months only of year 1912.

The above figures shew that, taking all groups together, wholesale prices had increased from 1000 in 1901-5 to 1115 in 1911-12; that is, an increase of 11.5 per cent., as against a corresponding increase for

retail prices and house rent of 13.8 per cent. Similarly comparing prices in 1906-10 with those in 1911-12, the wholesale index-number increased 7 per cent., as against 10.2 per cent. in the case of retail prices and rent. Turning, however, to the index-numbers for retail prices of groceries and food alone (last column), it is seen that retail prices had *not* increased in 1911-12 as much as the wholesale prices, either for groceries and food alone, or for all groups combined. It appears, therefore, that, *although cost of living in Melbourne has increased at a greater rate than wholesale prices, retail prices of food and groceries alone have not increased so much as wholesale prices, the greater increase in the cost of living being entirely due to advance in house rent.*

In graph C the index-numbers computed from import and export values for the whole Commonwealth are shewn in relation to index-numbers published by the Labour Department of the Board of Trade, England. The items included in these two sets of figures are almost uniform, prices in both cases being computed from the import and export values. It may be seen that the general trend of the graphs is, for the most part, identical, with the exception of the years 1902 and 1908, when prices were high in Australia owing to the droughts, and of the year 1904, when low prices prevailed in Australia.

The last graph (D) has already been referred to. It relates to groceries and food only, and shews clearly the connection between wholesale and retail prices in Melbourne, and import and export values for the whole Commonwealth. The large increases in 1902 and 1908 and the low prices prevailing in 1904 are seen in all the graphs. The average value of the index-numbers during the years 1901-5 were 1050, 1031, and 930 for wholesale, retail, and import and export prices, respectively, the corresponding levels for the next five years being 1042, 1021, and 964, respectively.

## VI.—COMPARISONS BETWEEN INDEX-NUMBERS FOR AUSTRALIA AND OTHER COUNTRIES.

**1. General.**—In several of the more important countries of the world, index-numbers have been computed on some system for a number of years. It is, therefore, possible to make some comparisons between the course of prices in Australia and other countries, but such comparisons are subject, however, to certain qualifications, inasmuch as there is no uniformity either in the list of commodities included or in the methods adopted for the collection of the data. Moreover, as already pointed out, the methods and technique adopted in the computation of the index-numbers in other countries are ordinarily far from satisfactory, and the results obtained are of limited accuracy, and are not reversible. This lack of reversibility becomes of special importance when it is desired to compare the various index-numbers by taking a common period as the base period throughout, as in the present case. For the index-numbers in different countries being originally computed with various periods or years as base, their reduction to a common period or year as base does not give the same results as would have been obtained had they been originally computed with the common period as base.

In spite of the foregoing objections, the index-numbers computed for the various countries may, for the most part, be taken as *roughly* indicating the general trend of prices and the general relative price levels at different periods. At any point they may really be subject to appreciable correction compared with results deduced from properly weighted data.*

In most countries the index-numbers are computed either from wholesale prices or from import and export values. In making any comparison between Australia and other countries, it will be preferable, therefore, to use the index-numbers based on Melbourne wholesale prices. These index-numbers have the further advantage that they are available for a considerable number of years.

2. **Index-Numbers for Various Countries.**—In the table on p. 77, price index-numbers are shewn for the following countries, viz:—the United Kingdom, Belgium, Germany, Italy, France, Canada, the United States, New Zealand, and Australia. These index-numbers have in each case been computed with the year 1911 as base (= 1000). In making any comparisons between the results it must, of course, be understood that the figures do not in any way shew the relative prices in different countries, but that they merely exhibit the fluctuations in price-level, taking the prices in 1911 as base (= 1000) in each country separately.

The question of relative cost of living in different countries is dealt with in Section VII. hereof.

The figures shewn in the last column may be termed the world's index-number, and have been computed by weighting the index-number for each country specified by a number representing its relative population. The weights used are as follow:—

**Weights (representing Relative Populations) used in Computation of World's Index-Number.**

| Country | United Kingdom | Belgium | Germany | Italy. | France. | Canada. | U.S.A. | N.Z. | Aus. |
|---|---|---|---|---|---|---|---|---|---|
| Weight .. | 45 | 7½ | 65 | 35 | 40 | 7 | 92 | 1 | 4½ |

These weights shew the predominating effect which countries with larger populations, such as the United States of America, Germany, and the United Kingdom, have on the world's index-number, compared with countries like Australia and New Zealand.

* It was not practicable to attempt a computation on fresh lines of the whole of the data.

## Index-Numbers of Wholesale Prices in Australia and Other Countries, 1840 to 1912, with Prices in 1911 as Base (= 1000).

| Par-tic'lars | United Kingdom. | | | | Bel-gium. | Ger-many. | Italy. | France | Can-ada | U.S.A. | New Zea-land. | Aus-tralia. | Av'rage w'ight'd according to Population. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Index No. | Econo-mist. | Board of Trade. | Sauer-beck. | Aver-age. | Wax-weiler. | Schmitz and Hooker | Imp'rts and Exports | Var-ious. | Dept. of Labor. | Aldrich Bureau of Labor | McIl-wraith. | Melb. whole-sale prices. | |
| No. of Items. | 22 | 45 | 39 | .. | 10 | 29 to 40 | ‡ | Vari-ious. | 230 | 90 to 257 | 33 to 45 | 80 | .. |
| 1840 | Not Available. | Not Available. | 1,287 | 1,287 | Not Available. | Not Available. | Not Available. | Not Available. | Not Available. | 1,105 | Not Available. | Not Available. | 1,165 |
| 1841 | | | 1,250 | 1,250 | | | | | | 1,095 | | | 1,146 |
| 1842 | | | 1,137 | 1,137 | | | | | | 1,020 | | | 1,058 |
| 1843 | | | 1,037 | 1,037 | | | | | | 960 | | | 985 |
| 1844 | | | 1,050 | 1,050 | | | | | | 964 | | | 992 |
| 1845 | | | 1,087 | 1,087 | | | | | | 972 | | | 1,010 |
| 1846 | | | 1,112 | 1,112 | | | | | | 1,006 | | | 1,041 |
| 1847 | | | 1,187 | 1,187 | | | | 1,006 | | 1,007 | | | 1,052 |
| 1848 | | | 975 | 975 | | | | 949 | | 959 | | | 961 |
| 1849 | | | 925 | 925 | | | | 1,041 | | 934 | | | 956 |
| 1850 | | | 962 | 962 | | | | 1,102 | | 968 | | | 996 |
| 1851 | 911 | | 937 | 924 | | 730 | | 1,083 | | 1,002 | | | 928 |
| 1852 | 815 | | 975 | 895 | | 741 | | 1,140 | | 971 | | | 923 |
| 1853 | 946 | | 1,187 | 1,066 | | 829 | | 1,255 | | 1,032 | | | 1,021 |
| 1854 | 1,069 | | 1,275 | 1,172 | | 884 | | 1,267 | | 1,068 | | | 1,071 |
| 1855 | 1,034 | | 1,262 | 1,148 | | 905 | | 1,267 | | 1,070 | | | 1,073 |
| 1856 | 1,078 | | 1,262 | 1,170 | | 898 | | 1,388 | | 1,071 | | | 1,095 |
| 1857 | 1,157 | | 1,312 | 1,234 | | 948 | | 1,369 | | 1,064 | | | 1,115 |
| 1858 | 1,043 | | 1,137 | 1,090 | | 827 | | 1,236 | | 963 | | | 991 |
| 1859 | 1,008 | | 1,175 | 1,083 | | 847 | | 1,299 | | 948 | | | 1,004 |
| 1860 | 1,080 | | 1,237 | 1,158 | | 882 | | 1,293 | | 946 | | | 1,026 |
| 1861 | 1,106 | | 1,225 | 1,165 | | 870 | | 1,261 | | 952 | 1,719 | 1,541 | 1,033 |
| 1862 | 1,173 | | 1,262 | 1,217 | | 894 | | 1,274 | | 1,114 | 1,738 | Not Avail-able. | 1,102 |
| 1863 | 1,377 | | 1,287 | 1,332 | | 910 | | 1,294 | | 1,406 | 1,804 | | 1,243 |
| 1864 | 1,509 | | 1,312 | 1,410 | | 933 | | 1,311 | | 1,802 | 1,822 | | 1,416 |
| 1865 | 1,329 | | 1,262 | 1,295 | | 870 | | 1,255 | | 2,051 | 1,766 | | 1,463 |
| 1866 | 1,292 | | 1,275 | 1,283 | | 890 | | 1,178 | | 1,807 | 1,869 | 1,756 | 1,368 |
| 1867 | 1,166 | | 1,250 | 1,208 | | 898 | | 1,125 | | 1,629 | 1,748 | Not Avail-able. | 1,273 |
| 1868 | 1,077 | | 1,237 | 1,157 | | 894 | | 1,087 | | 1,518 | 1,719 | | 1,212 |
| 1869 | 1,075 | | 1,225 | 1,150 | | 894 | | 1,079 | | 1,452 | 1,533 | | 1,186 |
| 1870 | 1,075 | | 1,200 | 1,137 | | 870 | | 1,086 | | 1,346 | 1,438 | | 1,137 |
| 1871 | 1,041 | 1,244 | 1,250 | 1,178 | | 918 | | 1,116 | | 1,287 | 1,402 | 1,233 | 1,142 |
| 1872 | 1,172 | 1,334 | 1,362 | 1,289 | | 1,020 | | 1,150 | | 1,313 | 1,438 | 1,339 | 1,206 |
| 1873 | 1,167 | 1,397 | 1,387 | 1,317 | | 1,058 | | 1,123 | | 1,301 | 1,533 | 1,454 | 1,215 |
| 1874 | 1,129 | 1,354 | 1,275 | 1,253 | | 972 | | 1,060 | | 1,258 | 1,505 | 1,390 | 1,153 |
| 1875 | 1,089 | 1,294 | 1,200 | 1,194 | | 910 | | 1,022 | | 1,207 | 1,384 | 1,340 | 1,100 |
| 1876 | 1,044 | 1,262 | 1,187 | 1,164 | | 886 | | 1,028 | | 1,118 | 1,308 | 1,354 | 1,056 |
| 1877 | 1,063 | 1,295 | 1,175 | 1,178 | | 890 | | 1,008 | | 1,049 | 1,346 | 1,314 | 1,030 |
| 1878 | 998 | 1,213 | 1,087 | 1,099 | | 816 | | 947 | | 957 | 1,260 | 1,219 | 950 |
| 1879 | 901 | 1,158 | 1,037 | 1,032 | | 741 | | 957 | | 914 | 1,187 | 1,213 | 903 |
| 1880 | 1,007 | 1,186 | 1,100 | 1,098 | | 827 | | 979 | | 1,011 | 1,215 | 1,112 | 1,016 |
| 1881 | 932 | 1,165 | 1,062 | 1,053 | | 808 | | 957 | | 1,000 | 1,177 | 1,124 | 955 |
| 1882 | 972 | 1,174 | 1,050 | 1,065 | | 784 | | 935 | | 1,026 | 1,140 | 1,292 | 964 |
| 1883 | 909 | 1,160 | 1,025 | 1,031 | | 769 | | 927 | | 1,003 | 1,103 | 1,186 | 938 |
| 1884 | 875 | 1,049 | 950 | 958 | | 733 | | 905 | | 940 | 1,075 | 1,130 | 887 |
| 1885 | 824 | 985 | 900 | 903 | | 678 | | 890 | | 880 | 1,037 | 1,112 | 838 |
| 1886 | 806 | 929 | 862 | 866 | | 643 | | 831 | | 869 | 1,009 | 1,092 | 807 |
| 1887 | 832 | 911 | 850 | 864 | | 663 | | 801 | | 876 | 963 | 1,059 | 809 |
| 1888 | 828 | 940 | 875 | 881 | | 706 | | 823 | | 891 | 963 | 1,077 | 837 |
| 1889 | 866 | 951 | 900 | 906 | | 741 | | 846 | | 891 | 1,037 | 1,174 | 853 |
| 1890 | 896 | 951 | 900 | 916 | 795 | 792 | 893 | 868 | 866 | 873 | 1,000 | 1,058 | 865 |
| 1891 | 879 | 983 | 900 | 921 | 811 | 796 | 843 | 865 | 852 | 864 | 1,009 | 945 | 855 |
| 1892 | 839 | 931 | 850 | 873 | 806 | 749 | 833 | 818 | 808 | 820 | 972 | 918 | 825 |
| 1893 | 841 | 915 | 850 | 869 | 751 | 728 | 828 | 847 | 805 | 817 | 935 | 850 | 810 |
| 1894 | 808 | 862 | 787 | 819 | 778 | 677 | 779 | 776 | 763 | 743 | 916 | 749 | 750 |
| 1895 | 768 | 833 | 775 | 792 | 770 | 661 | 780 | 732 | 776 | 724 | 869 | 760 | 732 |
| 1896 | 786 | 807 | 762 | 785 | 762 | 649 | 759 | 713 | 727 | 699 | 897 | 922 | 716 |
| 1897 | 764 | 824 | 775 | 788 | 787 | 671 | 749 | 724 | 724 | 694 | 906 | 925 | 721 |
| 1898 | 758 | 853 | 800 | 804 | 799 | 710 | 778 | 760 | 755 | 722 | 906 | 896 | 749 |
| 1899 | 786 | 844 | 850 | 827 | 805 | 744 | 841 | 830 | 786 | 786 | 916 | 809 | 797 |
| 1900 | 868 | 915 | 937 | 907 | 857 | 793 | 937 | 889 | 850 | 855 | 944 | 894 | 864 |
| 1901 | 823 | 886 | 875 | 861 | 868 | 765 | 863 | 832 | 840 | 839 | 916 | 974 | 831 |
| 1902 | 785 | 883 | 862 | 843 | 886 | 740 | 832 | 818 | 856 | 873 | 935 | 1,051 | 830 |
| 1903 | 819 | 886 | 862 | 856 | 890 | 785 | 843 | 832 | 868 | 878 | 935 | 1,049 | 847 |
| 1904 | 861 | 899 | 875 | 878 | 902 | 793 | 867 | 826 | 875 | 874 | 888 | 890 | 850 |
| 1905 | 856 | 893 | 900 | 883 | 901 | 817 | 861 | 832 | 895 | 896 | 916 | 910 | 864 |
| 1906 | 937 | 919 | 962 | 939 | 957 | 879 | 913 | 915 | 942 | 947 | 944 | 948 | 923 |
| 1807 | 1,014 | 967 | 1,000 | 994 | 962 | 952 | 953 | 966 | 991 | 1,001 | 1,000 | 1,021 | 978 |
| 1908 | 897 | 940 | 912 | 916 | 998 | 859 | 916 | 878 | 949 | 950 | 972 | 1,115 | 915 |
| 1909 | 883 | 951 | 925 | 920 | 981 | 887 | 926 | 890 | 952 | 978 | 944 | 993 | 931 |
| 1910 | 947 | 994 | 975 | 972 | 967 | 919 | 966 | 938 | 983 | 1,017 | 963 | 1,003 | 970 |
| 1911 | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1.000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** |
| 1912 | 1,055 | ‡ | 1,053 | 1,054* | ‡ | ‡ | ‡ | ‡ | 1,058* | 1,055* | ‡ | 1,174† | ‡ |

* Preliminary. † First nine months only. ‡ Not Available.

In the above table the index-numbers for the year 1911 for Germany, Italy, and France, and for the year 1910 for Italy, are not available, and were accordingly computed from the average increase in the index-numbers for the other countries specified. The index-numbers are shewn on the following graphs, the light line representing in each case the numbers for the individual countries, the heavy line on each shewing the weighted average for all countries (see last column of above table).

PRICE INDEXES, COMPARISONS BETWEEN INDEX—NUMBERS IN AUSTRALIA AND OTHER COUNTRIES, 1840 to 1912.


NOTE.—The heavy line represents in each case the "world's index-number" (see last column of preceding table); the light lines shew the index-numbers for the individual countries.

(i.) *United Kingdom.*—The figures shewn for the United Kingdom in the fourth column are the arithmetic means, where available, for the respective years, of the three index-numbers referred to.

(*a*) *"The Economist" Index-Numbers* are based on wholesale prices of 22 articles, as at the 1st January and the 1st July in each year. This method is open to the objection that *it does not give a true average price* for the whole year. Moreover, no system of weighting is used except that cotton appears three times, viz., as Surat cotton, cotton yarn, and cotton cloth. These index-numbers are published periodically in *"The Economist."*

(*b*) *Board of Trade Index Numbers* are stated to represent the wholesale index-numbers for 45 commodities, though in the majority of cases the data consist of import and export values, and not of wholesale price quotations. The price ratios are weighted according to the relative values consumed. The index-numbers are published in the *"Abstracts of Labour Statistics of the United Kingdom."*

(*c*) *Sauerbeck's Index-Numbers* are based on the average annual wholesale prices of 39 commodities. A crude and unsatisfactory method of weighting is adopted by taking, in some cases, two or three price quotations for certain commodities. For example, two grades of wheat and three of sugar are included, thus weighting wheat less than sugar, whereas the Board of Trade weight for wheat (47) is much larger than that for sugar (20). Again, Sauerbeck gives equal weights to coal, copper and iron by taking two quotations for each, whereas the Board of Trade weights for these commodities are 34, 5 and 16 respectively. As already mentioned, such divergencies in weights greatly prejudice the value of the deduced index-numbers.

(ii.) *Belgium.*—These index-numbers were published in a paper read before the International Statistical Institute in 1911 by E. Waxweiler. Beyond the fact that only 10 commodities are included, information as to methods adopted, etc., is not available.

(iii.) *Germany.*—The index-numbers from 1860 to 1889 are known as Schmitz's index-numbers, and are based on the wholesale prices at Berlin, Breslau, and Bremen of 29 articles. The crude system of weighting adopted by Sauerbeck of including two or three grades of certain articles has also been followed in these figures.

The index-numbers from 1890 to 1911 were computed by R. H. Hooker, M.A.,* in continuation of Schmitz's numbers, but they refer to 40 commodities, the same crude system of weighting being adopted.

(iv.) *Italy.*—These index-numbers represent the arithmetic mean of two index-numbers computed for imports and exports, respectively. No information is available as to the methods or technique followed. The index-numbers are published in the Journal of the Royal Statistical Society.*

---

* See "The Course of Prices at Home and Abroad," by R. H. Hooker, M.A. Journal of the Royal Statistical Society, London, December, 1911.

(v.) *France.*—The index-numbers from 1847 to 1879 represent the arithmetic mean of two import and export index-numbers computed by De Foville. From 1880 to 1889 they are based on official figures furnished by the Ministère du Travail et de la Prévoyance Sociale, and from 1890 to 1911 they are taken from *"La Réforme Economique,"* a periodical review published in Paris.

(*a*) *De Foville.*—The index-numbers from 1847 to 1879 are based on values for all imports and exports.*

(*b*) *Salaires et Coût de l'Existence.*—From 1880 to 1889 the index-numbers are based on either import or wholesale prices of 10 commodities, and are published in official documents.† No system of weighting is adopted for the computation of the results.

(*c*) *Réforme Economique.*—The particulars given from 1890 to 1910 are the index-numbers published by *La Réforme Economique.*‡ No information is available as to the number of commodities included or as to methods followed in deducing the results.

(vi.) *Canada.*—The index-numbers are published in the official publications of the Dominion Department of Labour.‖ They are based on the wholesale prices of 230 articles, but no proper system of weighting has been adopted. Several grades of certain important commodities have been taken, thus following Sauerbeck's method.

(vii.) *United States of America.*—The index-numbers given from 1840 to 1889 are those furnished in 1892 by the Finance Committee of the United States Senate. They are known as Aldrich's index-numbers. From 1890 to 1911 the numbers are those published by the United States Bureau of Labour.

(*a*) *Aldrich.*—These index-numbers are based on wholesale prices; from 1840 to 1859, 90 commodities were included, and from 1860 to 1889 the list was extended to comprise 223 commodities. Though several grades or qualities are taken of some articles, no proper system of weighting is adopted. This is, of course, a very unsatisfactory feature.

(*b*) *Bureau of Labour.*—The index-numbers for 1890 to 1911 are those published by the Federal Bureau of Labour in continuation of Aldrich's numbers. They relate to the wholesale prices of 257 articles, and are weighted in the same crude manner as Aldrich's, Sauerbeck's, and other index-numbers.

(viii.) *New Zealand.*—The index-numbers are taken from the Report of the Commission on the Cost of Living in New Zealand, 1912,

---

* See "The Principles of Money," by J. L. Laughlin. New York, 1903, p. 208.

† See "Salaires et Coût de l'Existence." Paris, 1911, pp. 44 and 45.

‡ See "The Course of Prices at Home and Abroad" by R. H. Hooker, M.A., *ut supra.*

‖ See "Wholesale Prices in Canada, 1890-1899" by R. H. Coats, B.A., Ottawa, 1910, and see also "The Labour Gazette," published monthly.

and are based on the wholesale prices of a number of commodities, ranging from 33 in 1861, to 45 in 1887 and onwards. The results are not weighted at all.

(ix.) *Australia.*—The index-numbers are based on the Melbourne wholesale prices of 80 commodities. Full particulars as to methods and technique have already been given in this Report.

3. **General Comparisons.** —The direction and relative extent of the movements in each country may be more readily seen by a consideration of the average prices during various periods compared with the average prices in 1911 and 1912.

The following table shews the index-numbers for the average prices in 1911-12, compared successively with the average price during each of the four preceding quinquennia as base:—

**Price-Indexes in Australia and other Countries, Changes in General Price Levels, between 1911-12, and Four Preceding Quinquennial Periods.**

| Particulars. | COUNTRY. | | | | | | | | | Weighted Average all C'ntries |
|---|---|---|---|---|---|---|---|---|---|---|
| | United Kingdom. | Belgium. | Germany. | Italy. | France | Canada. | U.S.A. | N.Z. | Aust. (Melb.) | |
| Average for 1891-5 as base | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** |
| 1911-12 .. | 1,201 | *1,277 | *1,385 | *1,230 | *1,239 | 1,285 | 1,293 | *1,064 | **1,288** | *1,259 |
| Average for 1896-1900 as base | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** |
| 1911-12 .. | 1,249 | *1,247 | *1,403 | *1,230 | *1,277 | 1,340 | 1,368 | *1,094 | **1,223** | *1,300 |
| Average for 1901-5 as base | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** |
| 1911-12 .. | 1,189 | *1,125 | *1,282 | *1,172 | *1,208 | 1,187 | 1,178 | *1,089 | **1,115** | *1,185 |
| Average for 1906-10 as base | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** |
| 1911-12 .. | 1,083 | *1,028 | *1,112 | *1,070 | *1,091 | 1,069 | 1,049 | *1,036 | **1,070** | *1,060 |

* 1911 only, 1912 prices not available.

The above figures shew the general increase in prices which has taken place in all countries since the nineties. It may be seen that the price-index for 1911-12 is in every case (except in New Zealand) greater in comparison with both the first two quinquennial periods than either of the last two periods, and also that the index-numbers for 1911-12 are greater when the years 1901-5 are taken as base, than the years 1906-10. This, of course, shews that prices have risen since the nineties.

Comparing prices in 1911-12 with the average for the five years 1891-5, it may be seen from the above table that the increase in Australia (28.8 per cent.) is greater than the increase for all countries

considered as a totality, *i.e.,* the increase based upon the weighted average (25.9 per cent.). The increase in Australia is practically the same as in Canada (28.5 per cent.); it is less than the increase in either Germany or the United States, but greater than that in any other of the countries specified.

Compared with the next five years, the increase in Australia (22.3 per cent.) is less than the weighted average for all countries (30.0 per cent.), and is also less than the increase in any other country except New Zealand, where it is only 9.4 per cent.

In regard to the average for the years 1901 to 1905, the increase in Australia (11.5 per cent.) is again less than the average (18.5 per cent.), and less than the increase in any other of the countries specified, except New Zealand (8.9 per cent.). Compared with the next five years, prices in Australia have increased 7.0 per cent., which is greater than the weighted average for all countries specified (6.0 per cent.), but is less than the increase in the United Kingdom, Germany, and France.

It appears, therefore, that compared with the first and last of the five-yearly periods, prices in Australia have increased in 1911-12 to a greater extent than in other countries, but that compared with the ten years 1896 to 1905 they have not increased so much as the average.

Reference to the graphs on page 78 shews that there is considerable similarity between the general trend of price movements in the several countries. It will be seen that on the graphs reference has been made chronologically to certain important events and occurrences, which are generally recognised as having had important influences on price movements in one or more of the countries. The effect of these events and occurrences on prices is referred to in some detail in the last section of this Report relating to the world's index-number and the factors controlling its movements.

Generally speaking, prices were low in about the year 1850 (see graphs for the United Kingdom, Germany, France, and the United States). They then increased rapidly for about five years, and were maintained at a comparatively high level until about 1865. In Germany, however, although prices rose from 1851 to 1857, their level, as compared with 1911, was not as high as in the other countries specified, while in America the rise did not set in until several years later (1861). In about the year 1865 a marked decline began, and lasted for about five years. From 1870 to 1873, there was a rapid recovery, except in the United States, where the progressive decline was arrested, but not converted into an increase. From 1873 until about 1887 there was a general fall, followed by a slight increase in most countries until 1890. Prices then again fell until about 1896, when they reached their minimum during the period under review. Since that year there has been a universal increase until the present time. It may be seen that on the whole the graph for Australia exhibits more violent fluctuations than those for other countries. This fact is due almost entirely to the effect of droughts, a matter which has already been referred to (see Sections II., III., and IV., hereinbefore).

# VII.—PRICES AND COST OF LIVING IN AUSTRALIA AND OTHER COUNTRIES.

**1. General.**—A direct and satisfactory comparison between the actual cost of living in Australia and other countries cannot be made, as the necessary income and expenditure budgets, at any rate on anything like a uniform and adequate basis, are not available. Analyses of the relative cost of living in different countries in order to be of value would have to take into account, among other things, the question of relative wages. It is intended to include information on this latter question, *viz.,* wages in different countries, in a further Report dealing with Rates of Wages, Hours of Labour, etc., to be issued by this Bureau in the course of a few months. In the meantime some comparison as to relative cost of living under identical regimens may be made by reference to tables of prices. Information about different standards of living or "regimens" are not available.

2. **Prices in Various Countries.**—The following table shews the prices of the 14 articles in common use in the several countries specified, so far as these are available from official returns.

Index-numbers have been computed by the aggregate expenditure method on the assumption that the "regimen," or the relative quantities of each of these 14 articles consumed is the same in each of the countries specified as in the Commonwealth. This assumption cannot be entirely justified. It is, for example, well known that the consumption of beef and mutton per head of the population in Australia is large compared with certain other countries.

**Retail Prices of Commodities, and Index-Numbers in Various Countries.**

| Commodity. | Unit. | Australia, Sydney, Jan.-Sep., '12 | Great Britain, 1911. | Belgium, 1910. | Denmark, Copenhagen, 1911. | France, Paris, 1911. | Holland, Amsterdam, 1911. | Germany,† 1911. | Italy, 1910. | Canada‡ 1911. | United States, Feb., 1909. | N.Z. 1911.§ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *d.* | *d.* | *d.* | *d.* | *d.* | *d.* | *d.* | *d.* | *d.* | *d.* | *d.* |
| Beef .. | pound | 4.9 | 6.9 | 6.5 | 7.6 | *11.0 | 10.6 | 9.4 | 7.0 | 7.4 | 7.0 | 6.1 |
| Mutton .. | ,, | 4.2 | 6.3 | 7.0 | 7.0 | *9.8 | 9.5 | 9.0 | .. | 7.4 | 7.5 | 5.1 |
| Pork .. | ,, | 8.1 | 8.4 | 8.8 | 7.9 | .. | 10.0 | 9.4 | 8.7 | 7.5 | 6.7 | 6.5 |
| Butter .. | ,, | 15.6 | 13.8 | 13.3 | 14.0 | *15.8 | 15.0 | 14.8 | .. | 13.3 | 16.7 | 13.4 |
| Bacon .. | ,, | 8.6 | 9.2 | 7.9 | 8.2 | 7.3 | 8.3 | 10.8 | 9.4 | 9.7 | 9.2 | 9.5 |
| Cheese .. | ,, | 11.7 | 7.3 | 8.6 | 4.9 | 7.6 | 8.5 | 9.5 | .. | 9.2 | 10.0 | 8.0 |
| Eggs .. | dozen | 20.1 | .. | .. | 13.1 | *13.8 | .. | 11.1 | .. | 15.8 | 14.7 | 12.0 |
| Milk .. | quart | 5.0 | 3.6 | 2.3 | 2.1 | .. | .. | 2.7 | 4.0 | 4.2 | 4.5 | 3.5 |
| Flour .. | pound | 1.4 | 1.2 | 1.4 | 1.7 | 1.8 | 1.6 | 2.4 | 1.8 | 1.6 | 1.8 | 1.5 |
| Bread .. | ,, | 1.7 | 1.3 | 1.2 | 2.2 | 1.3 | 1.4 | 1.6 | 1.6 | 1.8 | 2.8 | 1.7 |
| Potatoes | cwt. | 151.0 | 49.1 | 44.0 | 48.6 | 107.3 | 54.7 | 49.0 | 73.2 | 90.4 | 114.0 | 84.0 |
| Sugar .. | pound | 2.8 | 2.0 | 3.3 | 2.4 | 3.1 | 4.5 | 2.8 | .. | 2.8 | 2.9 | 2.6 |
| Coal .. | cwt. | 15.0 | 9.9 | 13.8 | 12.6 | 24.8 | .. | 18.1 | .. | 14.9 | 12.2 | 19.2 |
| Petroleum | gallon | 12.8 | 6.0 | 7.1 | 7.8 | 24.9 | 7.4 | 11.3 | .. | 9.7 | 7.2 | .. |
| Price-Indexes | .. | **1,000** | 890 | 932 | 992 | 1,410 | 1,353 | 1,158 | 998 | 1,075 | 1,161 | 991 |

* 1910. † Average of prices in Schönberg, Baden, Bavaria and Dresden. ‡ Average of prices in Quebec and Ottawa. § Average of prices in Auckland and Canterbury.

From the above table it appears that, in so far as the commodities specified are concerned, and on the assumption that the regimen in Australia applies to all the other countries, the United Kingdom is the

cheapest country, followed in the order named by Belgium, New Zealand, Denmark, Italy, Australia, Canada, Germany, the United States, and Holland, with France the most expensive.

It must, of course, be understood that these results are subject to the limitations already indicated, and that, on taking into account house-rent and other items of expenditure, and also decided differences of regimen and in habits of the people of the several countries, a quite different result might be obtained, such as would, for example, be deduced from analyses of actual income and expenditure budgets.

## VIII.—CHANGE IN STANDARD OF LIVING IN AUSTRALIA.

1. **General.**—It has already been pointed out that it is not proposed in connection with this Report to investigate the question of change in the *standard* of living, or in the "regimen," as it has been termed. The results of certain inquiries which have recently been made in this Bureau, however, point to the fact that some improvement in this standard has undoubtedly taken place during the past few years, and it has been thought desirable to include here some brief reference to these results. They concern, firstly, the consumption of commodities per head of population, and, secondly, certain facts relating to depositors in Savings Banks.

2. **Increased Consumption of Commodities per Head, 1903 to 1911.**—The following table shews for a number of commodities in common use:—(i.) The average annual consumption per head of the population in each successive five-yearly period from 1903-7 to 1907-11, as well as in the year 1911 alone; and (ii.) the ratios for the average annual consumption per head in each such period, compared with the average in 1911 alone (consumption in 1911 = 1000). To avoid minor fluctuations due to changes in stocks held, etc., it has been thought desirable to refer the results to the quinquennial averages indicated. The commodities included in the table are not identical with those comprised in that part of this Report which relates to Retail Prices and Cost of Living, but, so far as possible, they have been arranged so as to show under which of the Retail Price groups they should be properly classed. Articles which do not come within any of these groups are here classed as "Miscellaneous." In order to shew the general effect of the change in the consumption of all commodities taken together, index-numbers have been computed, for each period and for the year 1911 alone, by weighting the average annual consumption by numbers representing the relative average price during the whole period. The sum of the weights multiplied by the corresponding average annual consumptions in each period and in the year 1911 alone, divided by the sum of the weights, represents the relative expenditure in each period. The index-numbers have then been computed by taking the relative expenditure in 1911 as base (= 1000). These index-numbers are shewn in the last line of the table.

## Australia, Change in Standard of Living, Average Annual Consumption per Head of Population of certain Articles in common use, 1903 to 1911.

| PARTICULARS. | Weight* | Unit. | 1903–7. | 1904–8. | 1905–9. | 1906–10. | 1907–11. | 1911 (Single Year). |
|---|---|---|---|---|---|---|---|---|
| **AVERAGE ANNUAL CONSUMPTION PER HEAD OF POPULATION.** | | | | | | | | |
| **Group I.** | | | | | | | | |
| Tea .. .. | 15 | lb. | 6.9261 | 7.0991 | 7.0947 | 7.3275 | 7.4058 | 7.3091 |
| Coffee .. .. | 18 | ,, | .4505 | .4625 | .5065 | .5184 | .5290 | .5505 |
| Jams and Jellies .. | 4 | ,, | 17.0922 | 17.0522 | 16.9636 | 17.1390 | 17.5552 | 18.3258 |
| Dried Fruit .. | 8 | ,, | 5.7118 | 5.7568 | 5.8845 | 6.0496 | 6.0576 | 6.1813 |
| Confectionery, Cocoa and Chocolate | 18 | ,, | 6.1049 | 6.2238 | 6.5840 | 6.8861 | 7.1518 | 7.7740 |
| Pickles and Sauces | 12 | pint | 1,9601 | 2.0465 | 2.2293 | 2.5265 | 2.6933 | 3.0497 |
| Sugar .. .. | 3 | lb. | 102.3680 | 104.1600 | 104.8320 | 106.8480 | 106.8480 | 111.3280 |
| Soap .. .. | 2½ | ,, | 13.9645 | 14.0466 | 13.9325 | 14.1301 | 14.3653 | 15.0325 |
| **Group II.** | | | | | | | | |
| Bacon and Hams | 10 | lb. | 9.5179 | 9.9855 | 9.9204 | 9.8082 | 9.9261 | 11.3714 |
| Butter .. .. | 14 | ,, | 20.2348 | 21.1188 | 21.9008 | 22.5036 | 23.3006 | 24.7589 |
| Cheese .. .. | 10 | ,, | 3.4090 | 3.4004 | 3.5125 | 3.5731 | 3.5125 | 3.3709 |
| **Miscellaneous.** | | | | | | | | |
| Spirits .. .. | 420 | gal. | .7816 | .7753 | .7756 | .7849 | .8023 | .8494 |
| Beer .. .. | 36 | ,, | 10.7397 | 10.8295 | 10.9466 | 11.2440 | 11.5615 | 12.3650 |
| Tobacco .. .. | 84 | lb. | 2.2594 | 2.2576 | 2.2754 | 2.2828 | 2.2747 | 2.2646 |
| Cigars .. .. | 180 | ,, | .1436 | .1434 | .1448 | .1485 | .1522 | .1676 |
| Cigarettes .. .. | 168 | ,, | .3182 | .3306 | .3538 | .3842 | .4223 | .5077 |
| **RATIOS OF AVERAGE ANNUAL CONSUMPTION PER HEAD (CONSUMPTION IN 1911 = 1,000).** | | | | | | | | |
| **Group I.** | | | | | | | | |
| Tea .. .. .. .. | | | 947 | 971 | 970 | 1,002 | 1,013 | **1,000** |
| Coffee .. .. .. .. | | | 818 | 840 | 920 | 942 | 961 | **1,000** |
| Jams and Jellies .. .. .. | | | 933 | 930 | 926 | 935 | 958 | **1,000** |
| Dried Fruit .. .. .. | | | 924 | 931 | 952 | 979 | 980 | **1,000** |
| Confectionery, Cocoa and Chocolate .. .. .. | | | 785 | 801 | 847 | 886 | 920 | **1,000** |
| Pickles and Sauces .. .. .. | | | 643 | 671 | 731 | 828 | 883 | **1,000** |
| Sugar .. .. .. .. | | | 919 | 936 | 942 | 960 | 960 | **1,000** |
| Soap .. .. .. .. | | | 929 | 934 | 927 | 940 | 956 | **1,000** |
| **Group II.** | | | | | | | | |
| Bacon and Hams .. .. .. | | | 837 | 878 | 872 | 863 | 873 | **1,000** |
| Butter .. .. .. .. | | | 817 | 853 | 884 | 909 | 941 | **1,000** |
| Cheese .. .. .. .. | | | 1,011 | 1,009 | 1,042 | 1,060 | 1,042 | **1,000** |
| **Miscellaneous.** | | | | | | | | |
| Spirits .. .. .. .. | | | 920 | 913 | 913 | 924 | 944 | **1,000** |
| Beer .. .. .. .. | | | 869 | 876 | 885 | 909 | 935 | **1,000** |
| Tobacco .. .. .. .. | | | 998 | 997 | 1,005 | 1,008 | 1,005 | **1,000** |
| Cigars .. .. .. .. | | | 857 | 856 | 864 | 886 | 908 | **1,000** |
| Cigarettes .. .. .. .. | | | 627 | 651 | 697 | 757 | 832 | **1,000** |
| **Index Numbers for all Articles together** | | | 876 | 889 | 903 | 924 | 943 | **1,000** |

* Representing relative average price per unit.

The above table shews that, in the case of all commodities specified, except cheese, there has been yearly an increase in the quinquennial average quantity consumed per head of the population since 1903. The increase is particularly marked in the case of cigarettes, pickles and sauces, and confectionery, all of which, it is presumed, may be classed as luxuries.

The index-numbers in the last line of this table shew that, for the various articles specified, taking the consumption in 1911 as 1000, it was, on the average, only 876 in the five years 1903 to 1907, 889 in 1904 to 1908, and so on.

3. **Increase in Saving Banks Deposits.**—The figures given in the preceding paragraph show that, in spite of the increase in prices and cost of living in recent years, the average consumption of certain articles of common use has increased. This points to the inference that the purchasing power of the community has tended to increase at a greater rate than the increase in prices. This inference is corroborated by returns regarding depositors in Savings Banks.

The following table shews for each successive quinquennial period from 1903-7 to 1907-11, and for the year 1911 alone—(i.) the average number of savings bank depositors per 1000 of the population, the average amount of deposit, and the average amount of deposit per head of population, and (ii.) the ratios of each of these averages for each quinquennial period, taking the averages in 1911 as base (= 1000).

**Australia, Increase in Average Number of Savings Banks Depositors and Amount of Deposit, 1903 to 1912.**

| Particulars. | | 1903-7. | 1904-8. | 1905-9. | 1906-10 | 1907-11. | 1911. (Single Year). |
|---|---|---|---|---|---|---|---|
| AVERAGE NO. OF DEPOSITORS AND AMOUNT DEPOSITED. | | | | | | | |
| Depositors per 1000 of Population | No. | 286 | 296 | 306 | 317 | 330 | 362* |
| Average Amount of Deposit | £ | 32.130 | 32.660 | 33.413 | 34.330 | 35.320 | 37.122* |
| Deposits per Head of Population | £ | 9.196 | 9.663 | 10.228 | 10.880 | 11.646 | 13.420* |
| RATIO OF AVERAGE ANNUAL INCREASE (AVERAGES FOR 1911 = 1,000). | | | | | | | |
| Depositors per 1,000 of Population | No. | 790 | 818 | 845 | 876 | 912 | **1,000** |
| Average Amount of Deposit | .. | 865 | 880 | 900 | 925 | 951 | **1,000** |
| Deposits per Head of Population | .. | 685 | 720 | 762 | 811 | 868 | **1,000** |

* On the 30th June, 1912, the corresponding figures were :—Depositors per 1,000 of Population, 377 ; Average Amount of Deposit, 38.893 ; Deposits per Head of Population, 14.46.

Although the necessary statistical data are not available for demonstration, the undoubted increase during recent years in the number of places of amusement, accompanied by increased prices and sustained attendance at the metropolitan theatres, confirms the evidence provided by the figures in the preceding tables of the increased purchasing power and higher standard of living enjoyed by the people.

## IX.—WORLD'S INDEX-NUMBER OF PRICES.

1. **General.**—Very diverse reasons have been put forward for the world-wide movements in prices, such as the rise which occurred prior to the early seventies, the following decline, and, again, the rise in more recent years. While it is not the essential aim of this Report to analyse the cause of price movements, it is desirable to refer briefly to certain statistical and historical aspects of what is so frequently stated to constitute one of the main controlling factors—*viz.*, the world's gold-supply.

The following table shews the value of the average annual gold production of the world during each year since 1851, and the estimated annual production during the period 1840 to 1850. The "world's index-number of prices," shewn in the same table, has been compiled from the index-numbers for the countries already referred to, by weighting each index-number by a number proportional to the population of the country to which it refers (see p. 76 hereinbefore).

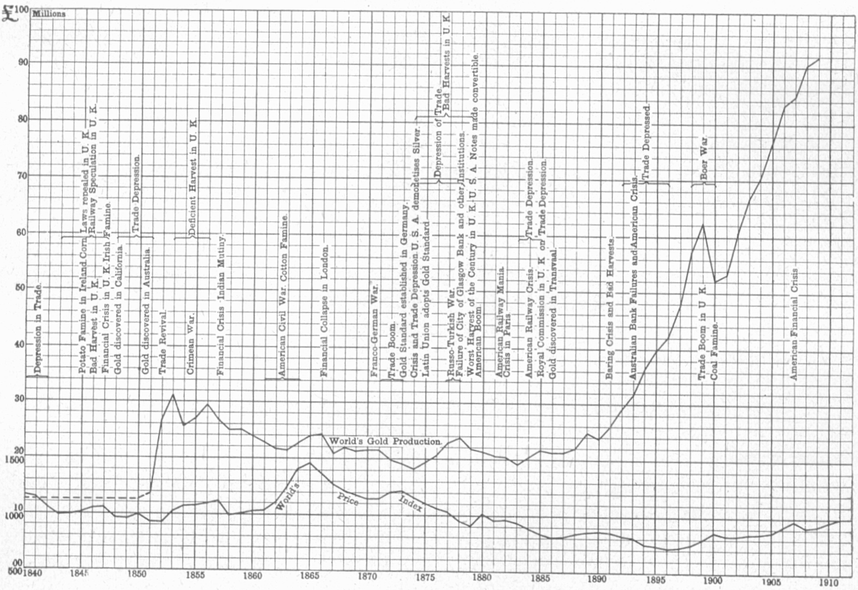
**World's Index Numbers and World's Gold Production, 1840 to 1911.**

| Year. | World's Index No.* | World's Gold Production. £0,000 omitted. | Year. | World's Index No.* | World's Gold Production. £0,000 omitted. |
|---|---|---|---|---|---|
| 1840 | 1,165 | | 1876 | 1,056 | 2,074 |
| 1841 | 1,146 | | 1877 | 1,030 | 2,280 |
| 1842 | 1,058 | | 1878 | 950 | 2,380 |
| 1843 | 985 | | 1879 | 903 | 2,180 |
| 1844 | 992 | | 1880 | 1,016 | 2,132 |
| 1845 | 1,010 | 1,250 | 1881 | 955 | 2,062 |
| 1846 | 1,041 | | 1882 | 964 | 2,040 |
| 1847 | 1,052 | | 1883 | 938 | 1,908 |
| 1848 | 961 | | 1884 | 887 | 2,034 |
| 1849 | 956 | | 1885 | 838 | 2,168 |
| 1850 | 996 | | 1886 | 807 | 2,120 |
| 1851 | 928 | 1,354 | 1887 | 809 | 2,106 |
| 1852 | 923 | 2,656 | 1888 | 837 | 2,204 |
| 1853 | 1,021 | 3,110 | 1889 | 853 | 2,470 |
| 1854 | 1,071 | 2,550 | 1890 | 865 | 2,377 |
| 1855 | 1,073 | 2,702 | 1891 | 855 | 2,613 |
| 1856 | 1,095 | 2,952 | 1892 | 825 | 2,926 |
| 1857 | 1,115 | 2,666 | 1893 | 810 | 3,169 |
| 1858 | 991 | 2,494 | 1894 | 750 | 3,650 |
| 1859 | 1,004 | 2,498 | 1895 | 732 | 3,980 |
| 1860 | 1,026 | 2,386 | 1896 | 716 | 4,225 |
| 1861 | 1,033 | 2,276 | 1897 | 721 | 4,820 |
| 1862 | 1,102 | 2,156 | 1898 | 749 | 5,814 |
| 1863 | 1,243 | 2,140 | 1899 | 797 | 6,301 |
| 1864 | 1,416 | 2,260 | 1900 | 864 | 5,209 |
| 1865 | 1,463 | 2,404 | 1901 | 831 | 5,334 |
| 1866 | 1,368 | 2,420 | 1902 | 830 | 6,062 |
| 1867 | 1,273 | 2,080 | 1903 | 847 | 6,676 |
| 1868 | 1,212 | 2,194 | 1904 | 850 | 7,052 |
| 1869 | 1,186 | 2,124 | 1905 | 864 | 7,688 |
| 1870 | 1,137 | 2,138 | 1906 | 923 | 8,317 |
| 1871 | 1,142 | 2,140 | 1907 | 978 | 8,476 |
| 1872 | 1,206 | 1,992 | 1908 | 915 | 9,036 |
| 1873 | 1,215 | 1,924 | 1909 | 931 | 9,308 |
| 1874 | 1,153 | 1,816 | 1910 | 970 | 9,419 |
| 1875 | 1,100 | 1,950 | 1911 | **1,000** | .. |

* This cannot, of course, be strictly calculated for reasons which will be clear on referring to Appendixes VIII. and IX.

The preceding figures are shewn in the following graph:—

WORLD'S INDEX-NUMBERS AND WORLD'S GOLD–SUPPLY, 1840 TO 1911.




The increase in the annual gold production and the rise and fall in average prices may be more readily seen by taking averages for quinquennial periods. The following table accordingly shews the value of the average annual gold production and the average of the annual index-numbers for each quinquennial period since 1841:—

**Value of Average Annual World's Gold Production and Average of corresponding Worlds' Index-Number for each Quinquennial Period from 1841 to 1910.**

| Period. | Average Index-Number. | Average Annual Gold Production. (£0,000) | Period. | Average Index-Number. | Average Annual Gold Production. (£0,000). |
|---|---|---|---|---|---|
| 1841-55 | 1,038 | } 1,250 | 1881-85 | 916 | 2,042 |
| 1846-50 | 1,001 | | 1886-90 | 834 | 2,255 |
| 1851-55 | 1,003 | 2,474 | 1891-95 | 794 | 3,268 |
| 1856-60 | 1,046 | 2,599 | 1896-1900 | 769 | 5,274 |
| 1861-65 | 1,251 | 2,247 | 1901-05 | 844 | 6,562 |
| 1866-70 | 1,235 | 2,191 | 1906-10 | 943 | 8,911 |
| 1871-75 | 1,163 | 1,964 | **1911** | **1,000** | * |
| 1876-80 | 991 | 2,209 | | | |

* Not available.

The average value of the world's production during the decade 1841 to 1850 was only £12,500,000; but it may be seen that in the next quinquennium the average value of the production had risen to £24,740,000 and £25,990,000 between 1856 and 1860, *viz.*, during the great impetus given by the almost simultaneous discoveries in Australia and California. It then fell to £19,640,000 in 1871-5.

When the rich alluvial deposits in these countries began to be worked out, and until the opening of the Transvaal mines, it remained fairly constant. It was then, viz., in about 1888, that the production commences to take an upward sweep, as the graph will shew. In 1891 the value produced exceeded £26,000,000, in 1898 it was £58,140,000, and in 1899 £63,010,000; then after a momentary reaction, caused by the South African War, the output rose to £66,760,000 in 1903, and to £94,190,000 in 1910. From 1896 to 1910 the output increased rapidly. The opening of the Klondike mines and the discovery and application of the cyanide process had important effects on the production. Thus, in 1910 the output was very nearly four times as great as in 1890, twenty years earlier.

The index-numbers given in the above table, being based on prices in all countries for which index-numbers are available, are, of course, more directly applicable than any others in an investigation into the relation between world's gold-supply and prices.

Now an examination of these two graphs shews several instances of corresponding upward or downward movements, which may be to some extent due to some law acting between the gold-supply and the world's prices, though, even if this be so, prices do not, in general, seem to feel the reaction set up by a change in the gold-supply, at least not till after a very noticeable interval. It is probably true that the important factor to consider, when estimating the effect of gold on prices, is not so much the annual production, as the quantity and rapidity of gold in circulation relatively to the varying demand for gold, arising, among other things, by extensions or contractions of credit. Notwithstanding that a large quantity of statistical material bearing more or less directly on these matters has been collected, no reliable estimates of gold in circulation, and therefore of velocity of circulation, are available, except for one or two countries.

2. **From 1850 to 1857.**—One of the most marked and frequently cited coincidences between increase in gold-production and a rise in prices is that which marks the periods between 1851 and 1857, following the abnormal and exceptional discoveries in Australia and California.

The increased output of gold in the fifties first found its way to Europe and the United States, and resulted in a large increase in the coinage of gold in England, France, and the United States, and thus, in the quantity of gold in actual circulation. The impetus given to general settlement by the gold discoveries (as in Victoria) created a demand for manufactured commodities, which tended to accelerate the rise in prices. Other influences, too, were operating in the same direction. The Crimean War tended to raise the price of many commodities, while in various countries, and especially in England, it is probable that a considerable extension of credit took place. Under the stimulus of abundant loan capital and an optimistic spirit of expanding trade, many new enterprises were started. During the years 1853 to 1856 there were bad seasons in England, and the price of foodstuffs rose to a high point. In 1857-8—at the time of the Indian Mutiny—the index-number shews a decline from 1115 to 991, and then, again, moves upward until 1865, when it was as high as 1463.

3. **Prices High from 1858 to 1873.**—The expansion of trade in the sixties was greatly assisted by the extension of the Limited Liability Acts to banking corporations in 1858, and by the passing of the Company Act, 1861, which gave a great impetus to the flotation of joint-stock enterprises. Inventions and discoveries also did much to assist the boom, as also did improvements in transport facilities and in the arts of manufacture. The introduction of the Bessemer process of steel making in 1859 is a landmark in the industrial history of the period.

Important influences are, on the other hand, commonly supposed to have operated in the opposite direction, such as the numerous wars during the fifties and sixties, which not merely kept men from productive occupations, but caused a considerable loss in life and property. When it is remembered that the period includes, among others, the Crimean, Austro-Prussian, Franco-Prussian, Danish and Italian wars in Europe, and the Civil War and the Mexican campaigns of Napoleon III. in America, it may readily be appreciated that war must have had adverse effects on trade and general prosperity.

From 1858 to 1865 prices rose rapidly, largely owing to the abnormal conditions in the United States of America. During this period, however, the gold production generally decreased. Between 1862 and 1866, the American Civil War cut off Lancashire's supply of cotton, and though this shortage stimulated cotton-growing in India and other countries, the supplies were quite insufficient. The cotton famine naturally had an effect on other textiles, and the price of wool and flax rose rapidly. After the end of the war prices again fell, but not quite to their old level. In the following period up to 1873, the output of gold continued to decrease, while prices shewed a marked rise from 1871 to 1873. Reviewing the whole period from 1855 to 1875, the decrease in the gold-production, coinciding with an extension of civilisation and trade over the whole world, and with new needs for gold, ought, it seems, on the theory which holds that the supply of gold is the supreme influence, to have led to a general fall in the price of commodities. Still, it is contended that the increased gold output of the previous years had not yet become insufficient to meet the consumption at the enhanced prices, and so the continuation of industrial development would still tend to exercise a predominant influence. So that, although it is stated that in the case of many manufactured articles a fall in price really occurred, owing to the boom in trade, reduced cost of transport, and other causes, natural products continued to increase in price, and the index-number for all commodities to rise. Speaking generally, it is probably true that the annual production of gold during the twenty-two years, from about 1851 to 1873, was available for monetary purposes, whereas the quantity available for the following two decades was largely absorbed by the extra demand due to changes in the monetary systems, so that the total monetary circulation did not increase during the latter period, even relatively to the reduced output of gold, to the same extent as in the former period.

4. **Prices Falling from 1873 to 1896.**—The period 1873 to 1896 was marked by a progressive fall in prices, this time probably in conformity with the stagnation or recoil in the supply of gold in relation to the demand therefor. It may be seen (see page 87) that from 1878 to 1883, there was a considerable decline in the world's production

of gold, but that after the following six years the output regained its former value. The important fact appears, however, to be that these years saw a great increase in the demand for gold. Immediately after the Franco-Prussian war, Germany decided to establish her currency on a gold basis, and a law to that effect was passed in December, 1871. The gold standard was not introduced until 1873, though it is stated that considerable importations of the precious metal took place immediately.* Further, the United States commenced to draw gold from Europe in 1878, consequent upon a law making the inconvertible Government bank-notes, which had been issued during the Civil War, convertible into gold at the United States Treasury. There is no reason to doubt that this resumption was followed by a great extension in the use of gold, and a country which was formerly one of the chief sources of supply began to reabsorb some of the world's gold. In other countries, too, currency reforms were effected at or about this period, and gold became practically the sole standard measure of value.* It may here be observed that the question of currency reforms in relation to the supply of gold is greatly complicated by various considerations, such as (*a*) changes in the rapidity of circulation of money, (*b*) economies in the use of coin either in international trade, by the payment of balances, by the transfer of stocks, or in general trade by the extension of banking facilities on the introduction of paper money, and (*c*) the amount of credit instruments in circulation, which varies with the commercial habits of the people and the character of the banking system.

It is alleged by many economists that the increase in production at this period had an important effect on prices. The highly remunerative prices hitherto prevailing are stated to have greatly stimulated production, and when prices declined, it is said that producers in many branches of trade were obliged to further increase their production, in order to balance, at least to some extent, the shrinkage of values.

The diminution in the cost of production and conveyance at this time probably had its greatest effect in extra-European Countries. As there had been a European era of the development of steam and of railways, so there was now an extra-European era. Not only were existing settlements connected, but the railroads were taken through uncultivated and sparsely populated districts, which were thus opened for new settlement. The producer could not only convey his products cheaper and quicker to port and to other countries, but he could also obtain his requirements at less cost and more rapidly. The effect of long distances was reduced owing to the better communications, and the increasing civilisation in the new countries attracted an increasing number of immigrants. Land was abundant, and other factors of production, such as labour and capital, were more easily acquired.

Steamers superseded more and more sailing vessels; their number increased enormously, and as they travelled three times as quick, their tonnage counted thrice that of the sailers. The opening of the Suez Canal had an additional influence in accelerating the conveyance of goods.

---

* See "On Prices of Commodities and the Precious Metals," A. Sauerbeck. "Journal of the Royal Statistical Society, London, Vol. 49 (1868), p. 587.

* See "An Introduction to the Study of Prices," W. T. Layton, M.A., London, 1912.

Another influence upon commerce generally may be ascribed to telegraphic communication; this kept producer and consumer in closer touch. As products could be quickly exchanged between various countries, less dependence was placed upon stocks, and the market could not be so easily manipulated by speculators. Also, the effect of bad harvests in certain districts or countries was minimised, as, thanks to the quick communications, a deficit in one country could be covered by an excess in another. If heavy stocks still existed, it was owing chiefly to the great production, and the unprofitable state of business, not to any great necessity for them; they consequently weighed upon the market with additional force, and caused a greater depression than similar quantities would have occasioned in former periods.

Last, but not least, may be mentioned the inventions of the period. Attention may specially be directed to the improvements in the smelting of ore, in the production of steel, and in the sugar industry; to the development of the chemical industry, and to the improvement of machinery in all branches.

To sum up, the following are the causes which have been alleged to be responsible for the appreciation in the purchasing power of gold during the period between 1873 and 1886.*

(*a*) Reduction in the cost of production would tend to cause the prices of these commodities to fall and to produce changes in relative prices, but would have no effect on the general price-level unless the quantities produced were increased.

(*b*) Reduction in the cost of transport would produce no effect on the general price-level, unless it led to an increase in the quantities of commodities produced, or to an increase in the number of exchanges.

(*c*) The reduced cost of production and the reduction of cost of transport would probably, and did in fact, cause changes in the relative advantages of different countries in the international trade of the world, which would have the effect of altering the internal scale of prices and wages in the countries affected.

(*d*) There was an increase in the quantities of commodities produced and an increase in the number of exchanges, both causes tending to bring about a fall in the general price-level.

(*e*) There were additional demands for gold due to the substitution of the gold for the silver standard in certain countries.

(*f*) There were additional demands for gold due to changes from inconvertible paper to a metallic (gold) standard.

(*g*) There were special demands for gold due to the great development of the United States of America. This cause is, to some extent, identical with that stated in (*c*).

(*h*) There was some reduction in the yearly production of gold.

From 1890 onwards the gold output began to rise with a rapidity probably without precedent. Yet the fall in prices for some years steadily continued, with a few interruptions (from 1886 to 1890) until 1896, thus shewing once more the same discordance, at least apparently, between the two phenomena. Perhaps there is something

* See "The Standard of Value." Sir David Barbonr, K.C.S.I., K.C.M.G., London, 1912.

analogous at this stage to what occurred in the other direction during the period between 1858 and 1873; and it is probable that any influence which the output of gold exercises on prices takes some years to shew itself. In any case, moreover, evidence as to increase in gold supply does not appear to be conclusive, until it is known whether a greater increase in the number of business transactions occurred involving increased use for gold. A feature of the period was the increase in overseas trade. It is obvious that increase of trade of this kind tends to bring about an even greater use of currency than increase in domestic trade, for every time that a commodity changes hands metallic currency or a credit document of some kind is given in exchange, and commodities brought to market from overseas will ordinarily change hands a greater number of times than domestic produce. Thus, as trade is developed and becomes more world-wide, a greater demand for currency or its equivalent tends to be brought about. It is unlikely, indeed, that there was any actual shortage of gold during this period, but prices are determined not only by the absolute amount of currency, but by the relative quantity of currency as compared with the volume of trade which it has to do and with other matters.

This view of the question has been presented by Professor Irving Fisher,* who points out that the total amount of money expended on commodities in a given community during a given period is equal to sum of the product of the average price of sale of each commodity into the quantity of such commodity sold. This must be equal to the amount of money in circulation among the community for that period, multiplied by its velocity of circulation. The money by which payment is made consists of (*a*) actual coin in circulation, and (*b*) credit money based on gold and on other forms of property deposited in the banks, the latter usually taking the form of bank-notes, cheques, and bills of exchange.† Therefore, it follows that the sum of (*a*) the amount of legal-tender currency in circulation multiplied by its velocity of circulation, and (*b*) the amount of credit money in circulation multiplied by its velocity, is equal to the sum of the prices of all commodities multiplied respectively by the quantity of each commodity sold. The general price-level, or the average of the prices, for the period is therefore equal to the sum of (*a*) the legal-tender currency multiplied by its velocity of circulation, and (*b*) the credit money multiplied by its velocity, divided by the total quantity of commodities sold.‡ It is, therefore, clear that *the general level of prices depends directly upon five factors, viz., (i.) The amount of money in circulation. (ii.) Its velocity of circulation.*

---

* See "The Purchasing Power of Money." Prof. Irving Fisher. New York, 1911

† See "Report of Commission on Cost of Living in New Zealand." Wellington, 1912, p. xxxv.

‡ The "Equation of Exchange" may be expressed mathematically as follows :—

If $M$ represent the quantity of actual currency money, and $V$ its velocity of circulation, $M_1$ the quantity of credit money and $V_1$ its velocity of circulation; also if the average prices of the various commodities sold during the period under review be $P_1$, $P_2$, $P_3$, etc., and the corresponding quantities sold be $Q^1$, $Q^2$, $Q^3$, etc., respectively, then

$$MV + M_1V_1 = \Sigma(PQ),$$

which may be written

$MV + M_1V_1 = PT$, where $P$ is a weighted average of all the $P$'s, and $T$ is the sum of all the $Q$'s. $P$ then represents in one magnitude *the level of prices*, and $T$ represents in one magnitude the volume of trade.

$$\text{The price level } P = \frac{MV + M_1V_1}{T}.$$

*(iii.) The amount of credit money in circulation.* *(iv.) Its velocity of circulation, and (v.) The total quantity of goods sold, that is the volume of trade.* It is obvious that if any one of these factors change in magnitude, there must result a change in the general level of prices; if more than one of them change, the net result on the level of prices will depend on whichever factor has a preponderating influence. The general principle stated by Professor Irving Fisher is that *the price level increases with the increase of money (either currency or credit) and with the velocities of their circulation, and decreases with an increase in the volume of trade.* Reaction to these factors is, however, not instantaneous, nor equally quick for each; hence the actual relation is very complex. It is, moreover, influenced by an element not susceptible of numerical evaluation, *viz.,* the human element of faith or confidence in the stability of economic relations at a particular moment.

**5. From 1896 to 1911, Prices Rising.**—The main features of the graph of prices since 1896 are the general upward movement, accompanied by the rises in 1900 and 1907, with a considerable depression in the intervening years, and since 1907 a fall with a further rise to the highest point in 1911. The average levels of the index-number during the three quinquennia, 1896 to 1910, were 769, 844 and 943 respectively, and the corresponding values of the gold production were £52,740,000, £65,620,000 and £89,110,000 respectively. The association of these changes in the same direction is frequently cited as proving the inter-relation between the two phenomena. It has already been pointed out, however, that any relation which may exist is of by no means a simple character.

It is alleged that the enormous additions to the world's gold since 1890 would have caused an economic revolution unless they had been absorbed under very special circumstances.*

The director of the United States Mint has published an estimate of the manner in which the output has been absorbed during the last twenty years. The world's industrial consumption of gold is stated to have been about £114,000,000 during the ten years from 1890 to 1899, and £191,000,000 during the eleven years 1900 to 1910. These figures are exclusive of amounts used in Asia, Egypt, and South America, which for both monetary, industrial and other purposes, are computed to have absorbed during the latter period (1900 to 1910) about £204,000,000. The table given on page 87 shews that the total output during the second period (1900 to 1910) was £825,770,000. Therefore, subtracting the value of that used industrially and also the amount absorbed by Asia, Egypt and part of South America, the remainder available for coinage and bank reserves in Europe, the United States, Canada, Australasia, and parts of South America, would be £430,770,000. There is little doubt that this addition has had a considerable influence in raising prices both directly and indirectly by enabling a large extension of credit to take place. It appears, moreover, that this influence has tended to be more marked in the United States than in other countries, and it is, in fact, stated that the most rapidly rising prices are, in the main, those over which the United States of America exercises a preponderating influence, especially in regard to tin, copper,

* See "An Introduction to the Study of Prices," W. T. Layton, M.A. London, 1911.

and cotton. This contention is, to some extent, borne out by the graphs on page 78 and the tables on pages 77 and 81. From these it may be seen that the increase in price-level in the United States since 1891 has been greater than in any other country except Germany.

In the report of the director of the United States Mint, it is pointed out that it is scarcely conceivable, at any rate under the existing banking system, that the industrial development which has taken place in the United States during the period 1901 to 1910 could have occurred or been financed without the enlarged bank reserves which the gold output provided. In regard to the effect of this development on prices, it is alleged that the operations of large industrial and commercial trusts have accelerated the upward movement of price-levels, and it is asserted that times of rising prices are more favourable than times of falling prices for monopolists who wish to maintain prices at a high level. It should be pointed out, however, that even if the United States had not absorbed such large quantities of gold in recent years, the abundance of currency in other countries might readily (in accordance with the principles of the "quantity" theory) have made the prices of commodities, in the production of which Europe plays the chief part, rise faster and higher than they actually have done.

It is maintained that in many countries the rapid rise of trusts, conferences, pools and other forms of trade combination or agreement belongs to the recent epoch of rising prices and must be considered contributory to it.*

It should be pointed out that, in the view of many economists, the increase in gold-production is not the main primary *cause* of the recent increase in prices. It is stated that the simplicity of that explanation is impaired by a crucial test, viz., the lower price of credit which should follow the increased flow of gold into the bank reserves and stimulate the increased borrowing and the circulation through the banks. It is maintained that no such lowering of the price of credit has occurred, but that, on the contrary, the price of money has been higher than usual during the period of expanding output of gold. While it is admitted that the increased output of gold has been an essential constituent in the production of credit, it is stated that the utilisation of stocks, shares and vendible goods as a credit-basis has facilitated an enormous expansion in the *demand* for credit, so great that, in spite of the tendency of abundant gold to lower its price, that price has actually risen, and, in spite of the rise, the enhanced demand has been maintained. The cause of this increased demand for credit is said to be due to the great development of profitable economic enterprises upon a large business scale that has been taking place simultaneously in a number of new areas of enterprise. The impetus given to development in South America and North West Canada, the entering of Japan upon an era of enterprise, and the general industrial expansion, taken in conjunction with the enlarged output of gold, are said to have involved a rapid and continuous demand for the application of large masses of capital. Moreover, the sinking of a large and growing proportion of the newly created wealth and labour of the world into developmental, but at present unremunerative, processes in the new and backward countries of the world, is said to be attended by a considerable sacrifice from

* See "Causes of the Rise of Prices" by J. A. Hobson. "The Contemporary Review," No. 562, October 1912.

the standpoint of consumers, in a corresponding immediate rate of increase in output of food and materials. If this be so, when the development of these new countries and enterprises has matured, an increase in output and a fall of prices may then be expected to ensue.*

6. **Conclusion.**—In conclusion, it may be said that, in the present state of knowledge, it would seem impossible to determine with any certainty to what extent the gold-supply directly influences price-levels, but there is evidently ground for the prevalent opinion that the two are closely related. It would seem, however, that any direct influence which the gold output may have on prices, is at many periods less perceptible than the effects of war and militarism, industrial activity and depression, seasonal and climatic influences, change in transport facilities, and methods of production consequent on scientific discovery and invention, the extension of the use of credit instruments, alternating crises in trade and financial speculation, capitalistic and industrial development and other contemporary movements.

---

*See "Causes of the Rise in Prices" by J. A. Hobson. "The Contemporary Review," No. 562, October, 1912.

# APPENDIX I.

## BIBLIOGRAPHY.


*Ashley, W. J.*—The Rise in Prices and the Cost of Living. London, 1912.

*Baden.*—Statistische Mitteilungen über das Grossherzogtum. Baden, 1912.

„ Statistisches Jahrbuch für das Grossherzogtum. Baden, 1912.

*Barbour, Sir David.*—The Standard of Value. London, 1912.

*Bavaria.*——Zeitschrift des k. bayerischen statistischen Landesamts, 1912. Nos. 2 and 3.

*Bulgaria.*—Annuaire Statistique du Royaume de Bulgarie, 1911.

*Canada.*—Labour Gazettes (Department of Labour). Ottawa.

*Coats, R. H.*—Wholesale Prices in Canada, 1890-1909 (Department of Labour). Ottawa, 1910.

*De Launay, L.*—The World's Gold. London, 1908.

*Del Mar, A.*—The Science of Money. London, 1896.

„ „ A History of the Precious Metals, 1880.

*Denmark.*—Statistik Aarbog, 1911.

*Economist, The.* London.

*Finland.*—Statistik Årsbok för Finland, 1911.

*Fisher, Irving.*—The Purchasing Power of Money. New York, 1911.

„ „ "American Economic Review." Boston, September, 1912.

*France.*—Salaries et Coût de l'Existence, 1911.

*Germany.*—Statistisches Jahrbuch für das Deutsche Reich. Berlin, 1912.

„ Vierteljahrshefte zur Statistik des Deutschen Reichs. Berlin, 1912.

„ Handwörterbuch der Staatswissenschaften. Vols. I to VIII, 1909-11.

*Giffen, Sir Robert.*—Economic Inquiries and Studies. London, 1904.

*Great Britain.*—Report on Wholesale and Retail Prices in the United Kingdom in 1902 (Board of Trade, H. C. 321). London, 1903.

„ „ Fifteenth Abstract of Labour Statistics of the United Kingdom (Board of Trade, Cd. 6228). London, 1912.

„ „ Enquiry into the Cost of Living, etc., in the Principal Industrial Towns of the United Kingdom (Board of Trade, Cd. 3864), 1908.

„ „ do. do. of Belgium (Cd. 5065), 1910.

„ „ „ of France (Cd. 4512), 1909.

„ „ „ of the United States of America (Cd. 5609), 1911.

„ „ „ of the German Empire (Cd. 4032), 1908.

„ „ Labour Gazettes. London.

*Hobson, J. A.*—The Science of Wealth.

„ „ "The Contemporary Review," No. 562, Oct., 1912.

*Holland.*—Jaarcijfers. Amsterdam, 1911.

*Hooker, R. H.*—"The Course of Prices at Home and Abroad, 1890-1910." Journal of the Royal Statistical Society, London, Dec., 1911.

*Hyndman, H. M.*—The Commercial Crises of the 19th Century. London, 1892.

*India.*—Variations in Indian Price Levels from 1861 to 1911 (Commercial Intelligence Department), 1912.

*Italy.*—Annuario Statistico Italiano, 1911.

BIBLIOGRAPHY—conntinued.

*Japan.*—Resumé statistique de l'Empire du Japon, 1912.

*Jevons, W. S.*—Principles of Economics. London, 1905.
„ „ Theory of Political Economy. London, 1888.

*Knibbs, G. H.*—An Inquiry into the Cost of Living in Australia, 1910-11.

*Laughlin, J. L.*—Principles of Money. New York, 1903.

*Layton, W. T.*—An Introduction to the Study of Prices. London, 1912.

*Mill, J. S.*—Principles of Political Economy. London, 1904.

*New South Wales.*—Statistical Registers.
„ „ Year Books.

*New Zealand.*—Report of the Commission on the Cost of Living in New Zealand, Wellington, 1912.
„ „ Year Books.

*Nicholson, J. S.*—A Treatise on Money. London, 1893.

*Norway.*—Statistik Aarbok, 1911.

*Palgrave, R. H. I.*—Dictionary of Political Economy.

*Queensland.*—Statistical Registers.

*Rogers, J. T.*—History of Agriculture and Prices in England. Oxford, 1866.

*Roumania.*—Bulletin Statistique de la Roumanie, 1912.

*Sauerbeck, A.*—Prices of Commodities and the Precious Metals. Journal of the Royal Statistical Society, London, 1886, and following years.

*Saxony.*—Statistisches Jahrbuch für das Königreich Sachsen, 1912.

*South Australia.*—Statistical Registers.

*Switzerland.*—Statistisches Jahrbuch der Schweiz, 1911.

*Tasmania.*—Statistical Registers.

*Taussig, F. W.*—Principles of Economics. New York, 1911.
„ „ Wages and Capital. New York, 1911.

*United States of America.*—Bulletins of the Bureau of Labour. Washington.
„ „ „ Wholesale Prices, 1890 to 1911. Bulletin, No. 99. March 1912.
„ „ „ Cost of Living and Retail Prices of Food. Eighteenth Annual Report of the Commissioner of Labour, 1903.

*Victoria.*—Statistical Registers.
„ Year Books.

*Walker, F. A.*—Political Economy. New York, 1888.

*Walsh, C. M.*—The Measurement of General Exchange Value. New York, 1901.

*Western Australia.*—Statistical Registers.

# APPENDIX II.

## Retail Prices in Metropolitan Towns, 1901 to 1912.

| Town. | 1901. | 1902. | 1903. | 1904. | 1905. | 1906. | 1907. | 1908. | 1909. | 1910. | 1911. | 1912 * |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bread, per 2 lb. Loaf.** | | | | | | | | | | | | |
| | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. |
| Sydney .. | 2.8 | 3.1 | 3.7 | 3.1 | 3.0 | 3.0 | 3.1 | 3.5 | 3.6 | 3.6 | 3.5 | 3.3 |
| Melbourne | 2.8 | 2.6 | 3.0 | 2.8 | 2.6 | 2.5 | 2.3 | 3.0 | 2.6 | 2.6 | 2.8 | 3.0 |
| Brisbane .. | 3.0 | 3.1 | 3.3 | 3.0 | 2.7 | 2.7 | 3.1 | 3.4 | 3.5 | 3.3 | 3.5 | 3.5 |
| Adelaide .. | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.1 | 3.1 | 3.5 | 3.0 | 3.0 | 3.5 |
| Perth .. | 3.0 | 3.8 | 4.4 | 3.6 | 3.5 | 3.5 | 3.1 | 3.5 | 3.1 | 3.4 | 3.5 | 3.5 |
| Hobart .. | 2.8 | 2.9 | 3.4 | 3.0 | 2.6 | 2.9 | 2.9 | 3.3 | 3.4 | 3.3 | 3.1 | 3.5 |
| **Flour, per 25 lb. Bag.** | | | | | | | | | | | | |
| Sydney .. | 1 11.0 | 2 7.0 | 3 4.3 | 2 0.5 | 2 7.7 | 2 6.2 | 2 8.4 | 3 0.7 | 3 3.6 | 3 0.7 | 2 9.8 | 2 10.4 |
| Melbourne | 2 0.1 | 2 6.7 | 3 1.1 | 2 4.7 | 2 4.1 | 2 3.9 | 2 7.3 | 2 9.6 | 2 10.1 | 2 8.9 | 2 6.5 | 2 6.7 |
| Brisbane .. | 2 3.9 | 2 6.8 | 2 11.7 | 2 6.4 | 2 7.4 | 2 9.8 | 2 7.9 | 3 1.6 | 3 3.8 | 3 4.2 | 3 0.8 | 3 1.7 |
| Adelaide .. | 2 3.1 | 2 4.7 | 3 2.0 | 2 6.3 | 2 7.6 | 2 7.3 | 2 6.5 | 2 11.5 | 2 11.5 | 2 11.7 | 2 8.1 | 2 9.1 |
| Perth .. | 2 11.0 | 3 2.1 | 3 1.7 | 3 1.2 | 3 1.3 | 2 11.4 | 2 9.5 | 2 11.0 | 3 1.3 | 3 0.6 | 2 11.0 | 2 8.4 |
| Hobart .. | 2 9.5 | 2 9.5 | 3 2.9 | 2 8.1 | 2 7.3 | 2 5.0 | 2 9.9 | 3 0.0 | 3 3.7 | 3 1.4 | 3 1.0 | 3 0.5 |
| **Tea, per lb.** | | | | | | | | | | | | |
| Sydney .. | 1 3.9 | 1 3.9 | 1 3.9 | 1 3.9 | 1 3.9 | 1 3.9 | 1 3.9 | 1 3.9 | 1 3.9 | 1 3.9 | 1 3.9 | 1 4.0 |
| Melbourne | 1 3.8 | 1 3.0 | 1 3.0 | 1 3.0 | 1 3.0 | 1 3.0 | 1 3.0 | 1 3.0 | 1 3.0 | 1 3.0 | 1 3.0 | 1 2.7 |
| Brisbane .. | 1 10.4 | 1 8.9 | 1 6.4 | 1 6.3 | 1 6.6 | 1 6.3 | 1 7.4 | 1 7.0 | 1 6.3 | 1 7.0 | 1 6.8 | 1 4.3 |
| Adelaide .. | 1 2.3 | 1 2.3 | 1 2.3 | 1 2.3 | 1 2.3 | 1 2.3 | 1 2.3 | 1 2.3 | 1 2.3 | 1 3.1 | 1 3.3 | 1 4.4 |
| Perth .. | 1 1.6 | 1 2.1 | 1 2.1 | 1 2.1 | 1 2.1 | 1 2.1 | 1 2.5 | 1 2.6 | 1 2.6 | 1 3.6 | 1 3.6 | 1 3.8 |
| Hobart .. | 1 2.9 | 1 2.9 | 1 2.9 | 1 2.9 | 1 2.9 | 1 2.9 | 1 2.9 | 1 2.9 | 1 2.9 | 1 2.9 | 1 2.9 | 1 3.4 |
| **Coffee, per lb.** | | | | | | | | | | | | |
| Sydney .. | 1 4.5 | 1 4.5 | 1 4.5 | 1 4.5 | 1 4.5 | 1 4.5 | 1 4.5 | 1 4.5 | 1 4.5 | 1 4.5 | 1 4.5 | 1 6.2 |
| Melbourne | 1 8.3 | 1 7.5 | 1 7.5 | 1 7.5 | 1 7.5 | 1 7.5 | 1 7.5 | 1 7.5 | 1 7.5 | 1 7.5 | 1 7.5 | 1 6.6 |
| Brisbane .. | 1 4.3 | 1 4.7 | 1 5.3 | 1 5.1 | 1 5.0 | 1 4.7 | 1 5.8 | 1 5.4 | 1 4.9 | 1 5.4 | 1 5.4 | 1 7.1 |
| Adelaide .. | 1 4.8 | 1 4.8 | 1 4.8 | 1 4.8 | 1 4.8 | 1 4.8 | 1 4.8 | 1 4.8 | 1 4.8 | 1 4.8 | 1 4.8 | 1 5.9 |
| Perth .. | 1 4.8 | 1 5.2 | 1 6.2 | 1 6.6 | 1 6.2 | 1 6.7 | 1 6.2 | 1 6.2 | 1 6.2 | 1 6.2 | 1 6.5 | 1 7.2 |
| Hobart. .. | 1 6.0 | 1 6.0 | 1 6.0 | 1 6.0 | 1 6.0 | 1 6.0 | 1 6.0 | 1 6.0 | 1 6.0 | 1 6.0 | 1 6.0 | 1 6.0 |
| **Sugar, per lb.** | | | | | | | | | | | | |
| Sydney .. | 2.3 | 2.6 | 2.6 | 2.6 | 2.7 | 2.6 | 2.6 | 2.6 | 2.6 | 2.8 | 2.8 | 2.9 |
| Melbourne | 2.6 | 2.3 | 2.3 | 2.3 | 2.4 | 2.2 | 2.2 | 2.3 | 2.5 | 2.7 | 2 7 | 3 0 |
| Brisbane .. | 2 1 | 2 3 | 2 4 | 2.4 | 2.5 | 2.6 | 2.4 | 2.3 | 2.4 | 2.5 | 2.5 | 3.0 |
| Adelaide .. | 2.3 | 2.5 | 2.5 | 2.4 | 2.6 | 2.4 | 2.3 | 2.4 | 2.5 | 2.7 | 2.6 | 2.9 |
| Perth .. | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.5 | 2.3 | 2.4 | 2.5 | 2.8 | 2.8 | 3.0 |
| Hobart .. | 2.5 | 2.6 | 2.6 | 2.5 | 2.6 | 2.5 | 2.5 | 2.5 | 2.5 | 2.6 | 2.7 | 3.0 |
| **Rice, per lb.** | | | | | | | | | | | | |
| Sydney .. | 2.3 | 2.4 | 2.8 | 3.0 | 3.0 | 2.8 | 2.8 | 2.8 | 2.8 | 2.5 | 2.8 | 2.8 |
| Melbourne | 2.8 | 2.6 | 2.8 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.8 | 2.8 |
| Brisbane .. | 3.2 | 3.0 | 2.9 | 2.9 | 3.1 | 2.9 | 3.1 | 3.2 | 2.6 | 2.6 | 2.6 | 2.6 |
| Adelaide .. | 2.6 | 2.9 | 2.9 | 2.7 | 2.5 | 2.7 | 2.9 | 2.6 | 2.6 | 2.6 | 2.7 | 3.3 |
| Perth .. | 2.2 | 2.6 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.0 |
| Hobart .. | 3.0 | 3.0 | 3.0 | 3.0 | 2.9 | 3.0 | 3.0 | 2.9 | 2.8 | 2.7 | 2.9 | 3.0 |
| **Sago, per lb.** | | | | | | | | | | | | |
| Sydney .. | 2.5 | 2.6 | 3.0 | 2.7 | 2.7 | 3.7 | 4.0 | 3.7 | 2.5 | 2.5 | 2.5 | 3.0 |
| Melbourne | 2.2 | 2.6 | 2.3 | 2.1 | 2.3 | 3.1 | 3.7 | 2.5 | 2.5 | 2.5 | 2.9 | 2.9 |
| Brisbane .. | 2.9 | 2.8 | 2.5 | 2.4 | 2.4 | 2.9 | 3.2 | 2.9 | 2.3 | 2.3 | 2.5 | 2.8 |
| Adelaide .. | 2.1 | 2.4 | 2.3 | 2.3 | 2.2 | 3.2 | 3.4 | 2.7 | 2.2 | 2.3 | 2.6 | 3.2 |
| Perth .. | 2.6 | 2.9 | 3.1 | 3.1 | 2.9 | 3.3 | 3.4 | 3.2 | 3.2 | 2.9 | 2.8 | 3.0 |
| Hobart .. | 3.7 | 3.3 | 2.9 | 2.6 | 2.7 | 3.2 | 3.9 | 3.3 | 2.4 | 2.5 | 2.9 | 3.2 |

* First 9 months.

## Retail Prices in Metropolitan Towns, 1901 to 1912—contd.

| TOWN. | 1901. | 1902. | 1903. | 1904. | 1905. | 1906. | 1907. | 1908. | 1909. | 1910. | 1911. | 1912.* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **JAM (Australian), PER LB.** | | | | | | | | | | | | |
| | d. | d. | d. | d. | d. | d. | d. | d. | d. | d. | d. | d. |
| Sydney .. | 3.6 | 3.6 | 4.1 | 3.6 | 4.1 | 4.1 | 3.8 | 3.8 | 3.6 | 3.6 | 4.0 | 4.4 |
| Melbourne | 3.8 | 4.0 | 3.9 | 4.0 | 3.9 | 4.1 | 4.0 | 3.9 | 3.8 | 4.0 | 4.0 | 4.0 |
| Brisbane .. | 4.4 | 4.3 | 4.2 | 3.8 | 3.8 | 3.8 | 3.8 | 3.9 | 3.8 | 3.9 | 3.8 | 3.9 |
| Adelaide .. | 3.3 | 3.4 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.4 |
| Perth .. | 4.2 | 4.1 | 4.0 | 3.9 | 3.9 | 3.9 | 3.9 | 3.8 | 3.9 | 3.9 | 4.0 | 4.1 |
| Hobart .. | 4.1 | 4.1 | 4.1 | 4.2 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.3 | 4.3 | 4.2 |
| **OATMEAL, PER LB.** | | | | | | | | | | | | |
| Sydney .. | 2 2 | 2.5 | 2.5 | 2.2 | 2.2 | 2.3 | 2.6 | 2.8 | 2.6 | 2 6 | 2 8 | 3.0 |
| Melbourne | 2.2 | 2.6 | 2.1 | 1.6 | 1.7 | 2.1 | 2.2 | 2.4 | 2.1 | 2.4 | 2.2 | 2.7 |
| Brisbane .. | 2.6 | 2.4 | 2.6 | 2.3 | 2.2 | 2.4 | 2.4 | 2.7 | 2.6 | 2.6 | 2.7 | 2.8 |
| Adelaide .. | 2.1 | 2.5 | 2.4 | 1.7 | 1.9 | 2.1 | 2.1 | 2.3 | 2.0 | 2.0 | 2.2 | 2.8 |
| Perth .. | 2.5 | 2.7 | 2.7 | 2.2 | 2.1 | 2.1 | 2.2 | 2.4 | 2.3 | 2.2 | 2.2 | 2.9 |
| Hobart. .. | 2.0 | 2.2 | 2.3 | 1.6 | 1.7 | 2.0 | 2.1 | 2.3 | 2.2 | 2.1 | 2.0 | 2.8 |
| **RAISINS, PER LB.** | | | | | | | | | | | | |
| Sydney .. | 6.2 | 6.9 | 7.0 | 6.0 | 5.9 | 5.3 | 4.8 | 7.2 | 5.9 | 6.5 | 6.0 | 6.2 |
| Melbourne | 7.7 | 6.4 | 6.3 | 5.5 | 6.0 | 6.3 | 6.4 | 6.4 | 6.2 | 6.5 | 6.5 | 6.3 |
| Brisbane .. | 7.4 | 6.2 | 5.4 | 5.4 | 5.3 | 5.3 | 6.0 | 6.2 | 6.6 | 6.6 | 6.6 | 6.4 |
| Adelaide .. | 6.5 | 6.3 | 6.3 | 6.1 | 6.1 | 6.6 | 6.3 | 6.3 | 6.3 | 6.5 | 6.5 | 6.2 |
| Perth .. | 7.5 | 8.2 | 7.5 | 7.7 | 7.4 | 7.5 | 7.6 | 7.4 | 7.4 | 7.2 | 7.4 | 6.4 |
| Hobart .. | 7.3 | 6.7 | 6.7 | 6.4 | 6.2 | 6.3 | 7.1 | 6.3 | 6.2 | 6.2 | 6.2 | 6.3 |
| **CURRANTS, PER LB.** | | | | | | | | | | | | |
| Sydney .. | 6.6 | 5.6 | 5.6 | 5.2 | 5.7 | 5.9 | 6.2 | 6.6 | 6.6 | 6.6 | 6.9 | 7.3 |
| Melbourne | 6.6 | 5.6 | 5.3 | 5.3 | 5.4 | 5.6 | 6.2 | 6.7 | 6.6 | 6.8 | 6.8 | 7.1 |
| Brisbane .. | 7.8 | 6.5 | 5.8 | 5.7 | 5.6 | 5.5 | 6.5 | 6.7 | 7.0 | 7.0 | 7.0 | 7.2 |
| Adelaide .. | 7.1 | 6.8 | 6.1 | 5.7 | 5.7 | 6.3 | 6.4 | 6.8 | 7.2 | 7.2 | 7.2 | 6.7 |
| Perth .. | 6.5 | 6.0 | 5.5 | 6.0 | 6.1 | 6.2 | 6.7 | 6.6 | 6.6 | 6.7 | 7.0 | 7.0 |
| Hobart .. | 7.1 | 6.1 | 5.7 | 5.2 | 5.5 | 5.5 | 6.6 | 7.0 | 7.1 | 7.1 | 7.4 | 7.7 |
| **STARCH. PER LB.** | | | | | | | | | | | | |
| Sydney .. | 3.8 | 3.5 | 4.8 | 5.5 | 5.0 | 5.4 | 5.5 | 5.5 | 5.5 | 6.0 | 6.0 | 5.6 |
| Melbourne | 4.8 | 5.3 | 5.1 | 4.9 | 4.7 | 4.9 | 4.8 | 4.8 | 5.0 | 5.0 | 5.0 | 5.3 |
| Brisbane .. | 5.6 | 5.5 | 5.3 | 5.3 | 5.3 | 5.2 | 5.4 | 5.3 | 5.3 | 5.3 | 5.4 | 5.5 |
| Adelaide .. | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 5.5 |
| Perth .. | 4.8 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 |
| Hobart .. | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| **BLUE, PER DOZEN SQUARES.** | | | | | | | | | | | | |
| Sydney .. | 8.9 | 8.9 | 8.9 | 8.9 | 8.9 | 8.9 | 8.9 | 8.9 | 8.9 | 8.9 | 8.9 | 8.9 |
| Melbourne | 5.1 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.2 | 6.4 | 6.3 | 6.4 | 6.6 |
| Brisbane .. | 8.6 | 8.8 | 8.7 | 7.7 | 7.9 | 7.3 | 7.4 | 7.6 | 7.9 | 8.0 | 7.9 | 8.3 |
| Adelaide .. | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.3 |
| Perth .. | 11.1 | 11.1 | 11.1 | 11.1 | 11.1 | 11.1 | 11.1 | 11.1 | 10.6 | 10.6 | 10.6 | 10.9 |
| Hobart .. | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 9.2 | 8.5 | 9.2 | 9.2 | 9.2 | 9.0 |
| **CANDLES, PER LB.** | | | | | | | | | | | | |
| Sydney .. | 5.6 | 5.6 | 5.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 |
| Melbourne | 7.1 | 6.4 | 6.5 | 6.4 | 6.3 | 6.3 | 6.5 | 6.6 | 6.6 | 6.6 | 6.6 | 6.4 |
| Brisbane .. | 7.1 | 6.8 | 6.2 | 6.4 | 6.4 | 6.4 | 6.6 | 6.5 | 6.4 | 6.7 | 6.6 | 6.6 |
| Adelaide .. | 6.8 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.2 | 7.2 | 7.2 | 7.1 |
| Perth .. | 6.8 | 7.3 | 7.3 | 7.3 | 6.9 | 6.9 | 7.2 | 6.9 | 6.4 | 6.2 | 6.4 | 7.4 |
| Hobart .. | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.8 | 5.3 | 5.4 | 5.4 | 5.4 | 5.9 |
| **SOAP, PER LB.** | | | | | | | | | | | | |
| Sydney .. | 2.2 | 2.2 | 2.6 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 3.0 |
| Melbourne | 3.0 | 2.9 | 3.0 | 3.0 | 2.9 | 2.9 | 3.1 | 3.0 | 3.0 | 3.1 | 3.1 | 3.6 |
| Brisbane .. | 2.6 | 2.7 | 2.5 | 2.3 | 2.5 | 2.3 | 2.5 | 2.5 | 2.5 | 2.5 | 2.6 | 2.4 |
| Adelaide .. | 2.4 | 2.4 | 2.5 | 2.6 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.8 | 2.8 | 2.6 |
| Perth .. | 2.7 | 2.6 | 2.7 | 2.7 | 2.7 | 2.8 | 3.0 | 3.0 | 2.8 | 2.8 | 3.0 | 2.9 |
| Hobart. .. | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.7 | 2.7 | 2.7 | 3.2 |

* First 9 months.

## Retail Prices in Metropolitan Towns, 1901 to 1912—contd.

| TOWN. | 1901. | 1902. | 1903. | 1904. | 1905. | 1906. | 1907. | 1908. | 1909. | 1910. | 1911. | 1912.* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **POTATOES, PER 14 LBS.** | | | | | | | | | | | | |
| | s. d. | s. d. | s. d | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d |
| Sydney .. | 11.3 | 11.3 | 8.3 | 6.0 | 1 3.8 | 1 3.8 | 6.8 | 10.9 | 10.9 | 11.3 | 11.3 | 1 6.9 |
| Melbourne | 8.5 | 10.5 | 8.3 | 6.1 | 1 0.9 | 1 1.7 | 7.5 | 9.6 | 8.9 | 11.3 | 10.0 | 1 1.9 |
| Brisbane .. | 1 0.8 | 1 0.1 | 7.6 | 6.8 | 1 2.3 | 1 3.6 | 10.7 | 1 2.1 | 1 1.8 | 1 2.7 | 1 4.9 | 1 9.9 |
| Adelaide .. | 1 0.9 | 1 1.3 | 8.8 | 8.9 | 1 1.4 | 1 1.9 | 9.1 | 10.7 | 11.7 | 11.9 | 11.4 | 1 4.3 |
| Perth .. | 1 5.8 | 1 5.5 | 1 3.3 | 1 4.4 | 1 7.7 | 1 7.7 | 1 3.7 | 1 4.5 | 1 4.0 | 1 5.5 | 2 8.3 | 1 9.8 |
| Hobart .. | 10.4 | 9.9 | 7.9 | 6.3 | 1 1.2 | 1 4.7 | 6.2 | 8.1 | 1 0.6 | 1 0.3 | 11.5 | 1 3.8 |
| **ONIONS, PER LB.** | | | | | | | | | | | | |
| Sydney .. | 1.4 | 0.8 | 0.6 | 0.5 | 2.0 | 1.0 | 0.6 | 1.2 | 1.1 | 0.7 | 0.6 | 2.1 |
| Melbourne | 1.1 | 0.9 | 0.8 | 0.7 | 1.2 | 1.1 | 0.7 | 1.5 | 1.2 | 1.1 | 0.8 | 2.0 |
| Brisbane .. | 1.7 | 1.3 | 1.0 | 0.9 | 2.3 | 1.2 | 1.0 | 1.6 | 1.4 | 0.9 | 0.9 | 2.1 |
| Adelaide .. | 1.9 | 1.2 | 1.0 | 1.0 | 2.2 | 1.3 | 1.0 | 1.4 | 1.5 | 1.2 | 1.3 | 2.3 |
| Perth .. | 2.0 | 2.0 | 1.5 | 1.7 | 2.5 | 1.7 | 1.7 | 1.8 | 1.9 | 1.6 | 1.6 | 2.4 |
| Hobart .. | 1.3 | 1.3 | 1.4 | 1.1 | 2.1 | 1.1 | 1.1 | 1.6 | 1.5 | 1.5 | 1.5 | 2.5 |
| **KEROSENE, PER GALLON.** | | | | | | | | | | | | |
| Sydney .. | 10.1 | 10.1 | 10.1 | 10.8 | 10.1 | 10.1 | 10.1 | 11.8 | 11.8 | 11.8 | 11.8 | 1 0.8 |
| Melbourne | 10.0 | 9.6 | 10.5 | 10.5 | 10.6 | 11.5 | 11.7 | 11.0 | 11.3 | 11.2 | 11.3 | 1 0.3 |
| Brisbane .. | 1 8.9 | 1 3.7 | 1 1.4 | 1 1.6 | 1 1.7 | 1 1.9 | 1 3.3 | 1 2.1 | 1 2.2 | 1 2.0 | 1 1.9 | 1 0.5 |
| Adelaide .. | 1 4.5 | 1 0.1 | 1 0.7 | 1 0.7 | 1 0.2 | 1 0.3 | 1 1.3 | 1 0.7 | 1 1.0 | 1 1.0 | 1 0.8 | 1 2.0 |
| Perth .. | 1 0.2 | 11.6 | 1 1.2 | 11.5 | 11.1 | 11.5 | 1 0.6 | 11.6 | 11.6 | 11.7 | 1 0.3 | 1 0.5 |
| Hobart .. | 1 4.3 | 1 2.4 | 1 1.3 | 1 0.6 | 1 0.7 | 1 1.3 | 1 1.8 | 1 2.3 | 1 1.9 | 1 2.2 | 1 1.8 | 1 2.7 |
| **MILK, PER QUART.** | | | | | | | | | | | | |
| Sydney .. | 4.0 | 4.6 | 4.5 | 3.8 | 4.0 | 4.0 | 4.3 | 5.0 | 4.8 | 4.5 | 4.4 | 5.0 |
| Melbourne | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.2 | 4.6 | 4.1 | 4.0 | 4.2 | 4.8 |
| Brisbane .. | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 4.9 | 4.9 | 4.8 |
| Adelaide .. | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.4 | 5.0 | 5.0 | 5.1 | 5.9 | 5.9 |
| Perth .. | 5.9 | 5.9 | 6.4 | 5.9 | 5.9 | 5.9 | 5.9 | 6.4 | 6.4 | 6.4 | 6.4 | 6.9 |
| Hobart. .. | 4.1 | 4.1 | 4.3 | 4.3 | 4.4 | 4.4 | 4.6 | 4.4 | 4.6 | 4.6 | 4.8 | 5.0 |
| **BUTTER, PER LB.** | | | | | | | | | | | | |
| Sydney .. | 1 0.2 | 1 4.4 | 1 2.2 | 10.2 | 1 1.0 | 1 1.2 | 1 1.0 | 1 3.4 | 1 2.4 | 1 1.5 | 1 1.7 | 1 3.6 |
| Melbourne | 1 2.8 | 1 5.4 | 1 2.5 | 1 0.2 | 1 2.0 | 1 1.7 | 1 2.3 | 1 4.3 | 1 2.9 | 1 2.4 | 1 1.7 | 1 4.2 |
| Brisbane .. | 11.9 | 1 3.6 | 1 2.0 | 9.9 | 11.8 | 1 0.0 | 11.7 | 1 3.0 | 1 1.3 | 1 0.7 | 1 1.0 | 1 3.0 |
| Adelaide .. | 1 4.0 | 1 5.2 | 1 1.6 | 11.2 | 1 1.2 | 1 1.2 | 1 0.7 | 1 3.6 | 1 2.2 | 1 1.3 | 1 2.0 | 1 5.8 |
| Perth .. | 1 6.9 | 1 7.1 | 1 5.0 | 1 3.7 | 1 4.0 | 1 4.0 | 1 3.7 | 1 4.8 | 1 3.7 | 1 3.3 | 1 3.4 | 1 4.9 |
| Hobart .. | 1 1.6 | 1 2.1 | 1 0.7 | 10.8 | 1 0.7 | 1 0.6 | 1 0.8 | 1 2.9 | 1 2.1 | 1 1.9 | 1 1.2 | 1 4.2 |
| **CHEESE, PER LB.** | | | | | | | | | | | | |
| Sydney .. | 7.8 | 10.0 | 9.5 | 7.6 | 9.5 | 9.0 | 10.3 | 1 0.0 | 10.7 | 9.8 | 9.5 | 11.7 |
| Melbourne | 9.2 | 10.4 | 10.4 | 10.5 | 9.9 | 10.4 | 9.9 | 10.7 | 10.3 | 10.5 | 9.9 | 11.1 |
| Brisbane .. | 10.0 | 10.8 | 10.9 | 9.2 | 9.9 | 8.8 | 9.8 | 11.0 | 10.9 | 10.4 | 10.6 | 11.2 |
| Adelaide .. | 10.9 | 10.4 | 10.2 | 10.4 | 10.4 | 10.1 | 10.3 | 10.4 | 10.5 | 10.7 | 10.7 | 11.5 |
| Perth .. | 10.3 | 10.8 | 1 0.3 | 11.5 | 11.3 | 10.4 | 10.4 | 11.2 | 10.7 | 10.4 | 10.2 | 11.9 |
| Hobart .. | 8.2 | 9.3 | 9.4 | 8.9 | 8.6 | 8.1 | 9.2 | 10.2 | 9.7 | 9.3 | 9.3 | 11.5 |
| **EGGS, PER DOZEN.** | | | | | | | | | | | | |
| Sydney .. | 1 3.7 | 1 6.8 | 1 6.8 | 1 2.3 | 1 0.6 | 1 1.7 | 1 3.0 | 1 5.2 | 1 5.4 | 1 5.0 | 1 5.0 | 1 8.1 |
| Melbourne | 1 4.1 | 1 4.2 | 1 2.8 | 1 3.0 | 1 2.5 | 1 3.8 | 1 4.3 | 1 3.9 | 1 4.2 | 1 5.4 | 1 5.2 | 1 6.6 |
| Brisbane .. | 10.3 | 10.7 | 1 0.1 | 9.5 | 9.9 | 9.7 | 11.3 | 1 1.9 | 1 1.6 | 1 2.8 | 1 3.4 | 1 6.9 |
| Adelaide .. | 10.3 | 1 0.7 | 1 1.7 | 1 0.2 | 1 0.0 | 11.5 | 1 0.1 | 1 1.4 | 1 0.8 | 1 1.2 | 1 1.4 | 1 3.9 |
| Perth .. | 1 8.5 | 2 0.2 | 2 1.3 | 1 7.5 | 1 8.5 | 1 9.3 | 1 8.6 | 1 10.2 | 1 8.2 | 1 8.3 | 1 8.4 | 1 10.4 |
| Hobart .. | 1 1.1 | 1 2.3 | 1 4.3 | 1 1.2 | 1 2.5 | 1 4.0 | 1 1.7 | 1 3.4 | 1 4.8 | 1 1.0 | 1 2.8 | 1 5.6 |
| **BACON (Middle Cut), PER LB.** | | | | | | | | | | | | |
| Sydney .. | 9.1 | 10.8 | 10.5 | 10.2 | 9.3 | 9.8 | 10.3 | 11.7 | 1 0.0 | 10.3 | 10.0 | 10.5 |
| Melbourne | 11.1 | 11.6 | 1 0.1 | 1 0.1 | 10.7 | 10.7 | 10.7 | 11.4 | 11.6 | 11.6 | 10.9 | 11.8 |
| Brisbane .. | 8.4 | 8.9 | 10.7 | 8.6 | 7.1 | 7.6 | 8.9 | 10.0 | 10.2 | 9.7 | 9.3 | 10.3 |
| Adelaide .. | 10.7 | 11.2 | 11.7 | 11.1 | 10.0 | 10.5 | 10.5 | 11.0 | 11.4 | 11.1 | 11.0 | 10.9 |
| Perth .. | 11.8 | 1 1.2 | 1 1.9 | 1 1.7 | 1 1.2 | 1 0.6 | 1 0.1 | 1 0.2 | 1 0.4 | 1 0.2 | 1 0.2 | 1 0.3 |
| Hobart. .. | 10.1 | 10.2 | 11.1 | 9.4 | 8.4 | 8.6 | 9.9 | 10.8 | 10.7 | 10.4 | 10.0 | 10.7 |

* First 9 months.

## Retail Prices in Metropolitan Towns, 1901 to 1912—contd.

| Town. | 1901. | 1902. | 1903. | 1904. | 1905. | 1906. | 1907. | 1908. | 1909. | 1910. | 1911. | 1912.* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bacon (Shoulder), per lb.** | | | | | | | | | | | | |
| | s. d. | s. d. | s. d. | s. d. | s d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. |
| Sydney .. | 6.7 | 6.8 | 7.3 | 8.0 | 7.0 | 8.2 | 6.7 | 7.1 | 6.7 | 6.7 | 6.8 | 6.8 |
| Melbourne | 6.5 | 6.5 | 7.0 | 7.0 | 6.1 | 6.2 | 6.1 | 6.5 | 6.9 | 6.8 | 6.1 | 6.8 |
| Brisbane .. | 5.6 | 5.9 | 7.3 | 5.7 | 5.2 | 5.8 | 6.3 | 7.0 | 6.8 | 6.8 | 6.4 | 7.1 |
| Adelaide .. | 6.2 | 6.3 | 6.4 | 6.3 | 5.8 | 6.1 | 6.1 | 6.1 | 5.7 | 5.7 | 6.1 | 6.5 |
| Perth .. | 8.9 | 9.4 | 9.2 | 9.1 | 9.2 | 8.4 | 7.8 | 8.2 | 8.4 | 8.3 | 8.6 | 7.8 |
| Hobart .. | 7.0 | 7.2 | 7.3 | 6.1 | 5.6 | 5.8 | 6.8 | 7.4 | 7.5 | 7.2 | 6.8 | 6.8 |
| **Ham, per lb.** | | | | | | | | | | | | |
| Sydney .. | 11.0 | 1 0.2 | 1 0.7 | 1 0.0 | 11.3 | 11.9 | 1 0.3 | 1 1.5 | 1 1.3 | 1 0.5 | 1 0.6 | 11.5 |
| Melbourne | 11.7 | 11.7 | 1 0.4 | 1 0.2 | 10.7 | 10.7 | 10.7 | 11.2 | 11.7 | 1 0.0 | 11.0 | 1 0.2 |
| Brisbane .. | 11.7 | 11.9 | 1 1.4 | 11.8 | 10.8 | 11.2 | 1 0.0 | 1 0.7 | 1 1.2 | 1 0.7 | 1 0.7 | 1 2.1 |
| Adelaide .. | 11.7 | 1 0.5 | 1 1.3 | 1 0.8 | 1 0.0 | 1 0.8 | 1 0.4 | 1 0.9 | 1 1.0 | 1 0.9 | 1 0.8 | 11.7 |
| Perth .. | 1 0.7 | 1 2.6 | 1 3.1 | 1 2.8 | 1 1.5 | 1 2.0 | 1 0.9 | 1 1.1 | 1 1.6 | 1 1.4 | 1 1.4 | 1 1.4 |
| Hobart .. | 1 0.6 | 1 0.4 | 1 1.4 | 1 0.6 | 1 0.2 | 1 0.2 | 1 0.6 | 1 1.6 | 1 0.8 | 1 0.6 | 1 0.6 | 1 0.8 |
| **Beef, Fresh, Sirloin, per lb.** | | | | | | | | | | | | |
| Sydney .. | 6.0 | 7.4 | 6.3 | 5.7 | 5.7 | 5.7 | 5.8 | 5.8 | 5.7 | 5.7 | 5.7 | 5.9 |
| Melbourne | 6.1 | 6.8 | 6.3 | 5.9 | 5.8 | 5.5 | 5.8 | 5.9 | 5.7 | 5.5 | 5.1 | 6.2 |
| Brisbane .. | 4.8 | 5.0 | 5.0 | 4.5 | 4.3 | 4.6 | 4.5 | 4.7 | 4.2 | 4.5 | 4.2 | 4.4 |
| Adelaide .. | 6.4 | 6.0 | 6.0 | 5.7 | 5.8 | 5.8 | 5.7 | 5.7 | 5.9 | 5.6 | 5.7 | 5.8 |
| Perth .. | 5.8 | 6.0 | 5.9 | 5.8 | 6.3 | 6.5 | 6.3 | 6.1 | 6.1 | 6.5 | 6.8 | 7.7 |
| Hobart .. | 6.1 | 6.9 | 6.7 | 6.5 | 6.5 | 6.4 | 6.3 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 |
| **Beef, Fresh, Rib, per lb.** | | | | | | | | | | | | |
| Sydney .. | 4.7 | 6.1 | 5.0 | 4.5 | 4.5 | 4.5 | 4.6 | 4.6 | 4.5 | 4.5 | 4.5 | 4.7 |
| Melbourne | 5.2 | 5.8 | 5.1 | 4.7 | 4.6 | 4.6 | 4.9 | 5.0 | 4.8 | 4.6 | 4.2 | 5.0 |
| Brisbane .. | 4.1 | 4.3 | 4.1 | 3.9 | 3.7 | 4.1 | 3.9 | 4.1 | 3.4 | 3.7 | 3.7 | 3.3 |
| Adelaide .. | 5.4 | 5.0 | 5.0 | 4.8 | 4.9 | 4.9 | 5.0 | 5.0 | 4.9 | 4.7 | 4.7 | 4.8 |
| Perth .. | 5.5 | 5.8 | 6.1 | 5.4 | 5.7 | 6.1 | 5.7 | 5.6 | 5.7 | 6.0 | 6.3 | 6.6 |
| Hobart. .. | 5.6 | 6.4 | 6.3 | 5.8 | 6.0 | 6.0 | 5.7 | 5.9 | 6 0 | 5 9 | 5.6 | 5.4 |
| **Beef, Fresh, Flank, per lb.** | | | | | | | | | | | | |
| Sydney .. | 3.6 | 4.7 | 3.9 | 3.4 | 3.4 | 3.4 | 3.5 | 3.5 | 3.4 | 3.4 | 3.4 | 3.9 |
| Melbourne | 4.5 | 5.2 | 4.5 | 4.0 | 4.0 | 3.9 | 4.2 | 4.4 | 4.2 | 3.9 | 3.6 | 4.0 |
| Brisbane .. | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 4.6 | 3.7 | 4.6 | 3.4 |
| Adelaide .. | 4.1 | 4.1 | 4.0 | 4.0 | 4.0 | 4.0 | 4.1 | 4.1 | 3.9 | 3.8 | 3.8 | 4.2 |
| Perth .. | 5.9 | 6.9 | 7.2 | 6.3 | 6.8 | 7.0 | 6.0 | 6.5 | 6.6 | 6.9 | 7.3 | 6.1 |
| Hobart .. | 4.0 | 4.6 | 4.5 | 4.2 | 4.2 | 4.0 | 4.1 | 4.1 | 4.2 | 3.9 | 3.6 | 3.9 |
| **Beef, Fresh, Shin, per lb.** | | | | | | | | | | | | |
| Sydney .. | 3.3 | 4.3 | 3.5 | 3.0 | 3.0 | 3.0 | 3.2 | 3.2 | 3.0 | 3.0 | 3.0 | 3.4 |
| Melbourne | 3.9 | 4.4 | 3.8 | 3.6 | 3.5 | 3.4 | 3.8 | 3.9 | 3.7 | 3.4 | 3.1 | 3.6 |
| Brisbane .. | 3.5 | 3.3 | 3.1 | 3.1 | 3.1 | 3.1 | 3.0 | 2.9 | 2.4 | 2.7 | 2.7 | 3.0 |
| Adelaide .. | 3.9 | 3.6 | 3.5 | 3.4 | 3.5 | 3.5 | 3.5 | 3.5 | 3.9 | 3.4 | 3.4 | 3.7 |
| Perth .. | 4.9 | 5.7 | 5.7 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 4.9 | 5.9 |
| Hobart .. | 4.0 | 4.3 | 4.5 | 4.1 | 4.6 | 4.3 | 4.1 | 4.1 | 4.3 | 4.0 | 4.0 | 4.5 |
| **Steak, Rump, per lb.** | | | | | | | | | | | | |
| Sydney .. | 7.3 | 8.7 | 8.1 | 6.7 | 6.7 | 6.7 | 7.0 | 7.0 | 6.7 | 6.7 | 6.7 | 8.2 |
| Melbourne | 8.0 | 8.8 | 8.4 | 8.2 | 8.2 | 8.0 | 8.4 | 8.3 | 8.0 | 7.5 | 6.9 | 8.7 |
| Brisbane .. | 5.3 | 6.1 | 6.3 | 5.7 | 5.6 | 6.5 | 6.3 | 6.6 | 6.2 | 6.3 | 6.1 | 6.4 |
| Adelaide .. | 7.8 | 7.6 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.3 | 8.0 | 8.0 | 8.1 |
| Perth .. | 9.7 | 10.7 | 11.2 | 10.2 | 10.2 | 10.4 | 10.4 | 10.4 | 10.7 | 10.4 | 10.5 | 11.8 |
| Hobart .. | 8.0 | 8.6 | 8.6 | 8 1 | 8.4 | 8.3 | 8.4 | 8.0 | 8.4 | 8.1 | 8.1 | 8.4 |
| **Steak, Shoulder, per lb.** | | | | | | | | | | | | |
| Sydney .. | 4.1 | 5.0 | 4.3 | 3.4 | 3.4 | 3.4 | 3.6 | 3.6 | 3.4 | 3.4 | 3.4 | 4.1 |
| Melbourne | 4.6 | 5.2 | 4.5 | 4.3 | 4.2 | 4.2 | 4.5 | 4.4 | 4.2 | 4.1 | 3.9 | 4.4 |
| Brisbane .. | 3.7 | 4.2 | 4.3 | 3.7 | 3.6 | 4.1 | 4.2 | 4.5 | 3.8 | 3.7 | 3.5 | 3.8 |
| Adelaide .. | 5.4 | 5.0 | 5.0 | 4.9 | 4.9 | 5.0 | 4.5 | 4.4 | 4.5 | 4.1 | 4.4 | 4.5 |
| Perth .. | 5.6 | 6.3 | 7.2 | 6.3 | 7.1 | 7.5 | 7.0 | 6.5 | 6.9 | 7.3 | 7.3 | 7.2 |
| Hobart. .. | 5.1 | 5.6 | 5.6 | 5.4 | 5.3 | 5.1 | 5.3 | 5.2 | 5.4 | 5.2 | 5.1 | 5.3 |

* First 9 months of 1912.

## Retail Prices in Metropolitan Towns, 1901 to 1912—contd.

| TOWN. | 1901. | 1902. | 1903. | 1904. | 1905. | 1906. | 1907. | 1908. | 1909. | 1910. | 1911. | 1912.* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **STEAK, BUTTOCK, PER LB.** | | | | | | | | | | | | |
| | d. | d. | d. | d | d. | d. | d. | d. | d. | d. | d. | d. |
| Sydney .. | 4.2 | 5.2 | 4.4 | 3.5 | 3.5 | 3.5 | 3.7 | 3.7 | 3.5 | 3.5 | 3.5 | 4.2 |
| Melbourne | 5.1 | 5.8 | 5.1 | 4.9 | 4.8 | 4.7 | 5.1 | 4.9 | 4.7 | 4.6 | 4.3 | 5.0 |
| Brisbane .. | 4.1 | 4.3 | 4.5 | 3.8 | 3.7 | 4.0 | 4.1 | 4.3 | 4.2 | 3.8 | 3.6 | 3.7 |
| Adelaide .. | 5.2 | 4.9 | 4.9 | 4.9 | 4.9 | 5.0 | 4.9 | 4.7 | 4.9 | 4.7 | 4.7 | 4.9 |
| Perth .. | 4.6 | 5.4 | 5.7 | 4.7 | 5.5 | 5.6 | 5.3 | 4.8 | 5.1 | 5.5 | 5.5 | 7.2 |
| Hobart .. | 6.3 | 6.9 | 6.9 | 6.2 | 6.4 | 6.4 | 6.3 | 6.2 | 6.5 | 5.9 | 5.9 | 6.0 |
| **BEEF (Corned), ROUND, PER LB.** | | | | | | | | | | | | |
| Sydney .. | 4.6 | 6.2 | 5.6 | 4.3 | 4.3 | 4.3 | 4.4 | 4.4 | 4.3 | 4.3 | 4.3 | 4.5 |
| Melbourne | 5.2 | 5.9 | 5.2 | 5.0 | 4.9 | 4.9 | 5.2 | 5.1 | 4.9 | 4.7 | 4.4 | 5.1 |
| Brisbane .. | 5.1 | 5.8 | 5.6 | 5.1 | 5.1 | 5.3 | 5.4 | 5.4 | 5.1 | 4.8 | 4.8 | 4.4 |
| Adelaide .. | 6.3 | 6.2 | 6.2 | 5.9 | 6.1 | 6.1 | 5.7 | 5.7 | 5.8 | 5.4 | 5.7 | 5.7 |
| Perth .. | 6.0 | 6.4 | 6.8 | 6.4 | 7.2 | 7.2 | 6.9 | 6.4 | 6.9 | 7.3 | 7.4 | 7.0 |
| Hobart .. | 5.7 | 6.0 | 6.0 | 5.7 | 5.9 | 5.7 | 5.6 | 5.7 | 5.8 | 5.7 | 5.7 | 5.9 |
| **BEEF (Corned), BRISKET WITH BONE, PER LB.** | | | | | | | | | | | | |
| Sydney .. | 3.6 | 5.3 | 4.7 | 3.4 | 3.4 | 3.4 | 3.6 | 3.5 | 3.4 | 3.4 | 3.4 | 3.0 |
| Melbourne | 3.1 | 3.7 | 3.0 | 3.1 | 3.0 | 3.0 | 3.3 | 3.1 | 3.0 | 2.7 | 2.4 | 3.1 |
| Brisbane .. | 3.4 | 4.0 | 4.0 | 3.4 | 3.3 | 3.4 | 3.4 | 3.7 | 3.3 | 3.1 | 3.1 | 2.9 |
| Adelaide .. | 4.1 | 3.9 | 3.9 | 3.6 | 3.9 | 3.9 | 3.6 | 3.6 | 3.7 | 3.6 | 3.6 | 3.6 |
| Perth .. | 4.0 | 4.7 | 5.2 | 4.4 | 4.7 | 4.7 | 4.5 | 4.5 | 4.5 | 4.7 | 4.7 | 4.6 |
| Hobart .. | 4.2 | 4.7 | 4.9 | 4.3 | 4.5 | 4.3 | 4.3 | 4.3 | 4.5 | 4.2 | 4.0 | 3.5 |
| **BEEF (Corned), BRISKET WITHOUT BONE, PER LB.** | | | | | | | | | | | | |
| Sydney .. | 4.7 | 6.3 | 5.8 | 4.4 | 4.4 | 4.4 | 4.6 | 4.6 | 4.4 | 4.4 | 4.4 | 3.9 |
| Melbourne | 4.3 | 4.9 | 4.2 | 4.1 | 4.0 | 3.9 | 4.2 | 4.1 | 3.9 | 3.7 | 3.6 | 4.1 |
| Brisbane .. | 4.0 | 4.5 | 4.5 | 3.7 | 4.0 | 4.2 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.9 |
| Adelaide .. | 5.5 | 5.3 | 5.3 | 5.0 | 5.3 | 5.3 | 4.7 | 4.7 | 4.7 | 4.7 | 4.2 | 4.5 |
| Perth .. | 5.3 | 6.2 | 6.5 | 5.7 | 6.2 | 6.2 | 6.0 | 5.7 | 5.8 | 6.2 | 6.5 | 6.0 |
| Hobart. .. | 5.0 | 5.4 | 5.5 | 5.1 | 5.1 | 5.0 | 5.2 | 5.1 | 5.2 | 5.0 | 5.0 | 4.4 |
| **MUTTON, LEG, PER LB.** | | | | | | | | | | | | |
| Sydney .. | 4.2 | 5.0 | 4.6 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.7 | 4.0 |
| Melbourne | 4.0 | 4.3 | 4.2 | 4.4 | 4.1 | 3.9 | 4.1 | 3.8 | 3.5 | 3.6 | 3.4 | 4.2 |
| Brisbane .. | 4.7 | 5.1 | 5.1 | 4.6 | 4.6 | 4.7 | 4.6 | 4.7 | 3.9 | 3.8 | 3.9 | 4.6 |
| Adelaide .. | 5.0 | 4.6 | 4.6 | 4.4 | 4.4 | 4.2 | 3.8 | 3.8 | 4.1 | 3.8 | 3.8 | 4.4 |
| Perth .. | 7.0 | 7.7 | 7.2 | 7.5 | 7.6 | 7.2 | 7.3 | 7.5 | 7.1 | 7.3 | 7.6 | 7.9 |
| Hobart .. | 4.9 | 5.4 | 5.2 | 5.4 | 5.2 | 5.3 | 5.4 | 5.2 | 5.6 | 5.5 | 4.7 | 5.3 |
| **MUTTON, SHOULDER, PER LB.** | | | | | | | | | | | | |
| Sydney .. | 3.5 | 4.4 | 3.9 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.2 | 3.1 | 3.4 |
| Melbourne | 3.4 | 3.9 | 3.8 | 3.9 | 3.6 | 3.5 | 3.6 | 3.4 | 3.0 | 3.1 | 2.9 | 3.4 |
| Brisbane .. | 3.6 | 3.9 | 4.0 | 3.6 | 3.6 | 3.2 | 3.2 | 3.4 | 2.9 | 3.1 | 3.1 | 3.1 |
| Adelaide .. | 4.1 | 3.7 | 3.7 | 3.7 | 3.7 | 3.5 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.6 |
| Perth .. | 5.9 | 6.5 | 6.1 | 6.3 | 6.6 | 6.1 | 6.2 | 6.3 | 5.9 | 6.2 | 6.4 | 6.7 |
| Hobart .. | 4.0 | 4.4 | 4.5 | 4.4 | 4.5 | 4.4 | 4.5 | 4.1 | 4.4 | 4.5 | 4.2 | 4.4 |
| **MUTTON, LOIN, PER LB.** | | | | | | | | | | | | |
| Sydney .. | 4.1 | 4.7 | 4.5 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.8 | 3.7 | 4.5 |
| Melbourne | 3.9 | 4.4 | 4.2 | 4.4 | 4.1 | 4.0 | 4.1 | 3.8 | 3.7 | 3.8 | 3.5 | 4.2 |
| Brisbane .. | 4.6 | 5.0 | 5.0 | 4.6 | 4.5 | 4.7 | 4.5 | 4.8 | 4.6 | 4.0 | 4.1 | 4.8 |
| Adelaide .. | 4.6 | 4.4 | 4.5 | 4.3 | 4.3 | 4.1 | 3.8 | 3.8 | 4.0 | 4.0 | 4.0 | 4.5 |
| Perth .. | 6.0 | 6.7 | 6.3 | 6.5 | 6.7 | 6.3 | 6.4 | 6.5 | 6.2 | 6.4 | 6.6 | 7·4 |
| Hobart .. | 5.5 | 5.9 | 6.0 | 5.6 | 5.6 | 5.8 | 5.7 | 5.7 | 6.2 | 6.2 | 5.3 | 5.1 |
| **MUTTON, NECK, PER LB.** | | | | | | | | | | | | |
| Sydney .. | 3.4 | 4.1 | 3.8 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.1 | 3.0 | 3.6 |
| Melbourne | 3.2 | 3.6 | 3.5 | 3.7 | 3.3 | 3.3 | 3.4 | 3.0 | 2.8 | 3.0 | 2.6 | 3.0 |
| Brisbane .. | 4.3 | 4.6 | 4.8 | 4.3 | 4.2 | 4.3 | 4.4 | 4.4 | 4.2 | 3.7 | 3.7 | 4.3 |
| Adelaide .. | 3.7 | 3.5 | 3.5 | 3.3 | 3.4 | 3.3 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.4 |
| Perth .. | 5.1 | 5.7 | 5.2 | 5.5 | 5.7 | 5.2 | 5.3 | 5.5 | 5.1 | 5.3 | 5.6 | 5.9 |
| Hobart. .. | 4.0 | 4.2 | 4.2 | 4.2 | 4.0 | 4.2 | 4.3 | 4.2 | 4.5 | 4.3 | 3.9 | 4.0 |

* First 9 months of 1912.

## Retail Prices in Metropolitan Towns, 1901 to 1912—contd..

| TOWN. | 1901. | 1902. | 1903. | 1904. | 1905. | 1906. | 1907. | 1908. | 1909. | 1910. | 1911. | 1912.* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CHOPS, LOIN, PER LB. | | | | | | | | | | | | |
| | d. | d. | d. | d. | d. | d. | d. | d. | d | d. | d. | d. |
| Sydney .. | 4.4 | 5.5 | 4.8 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.1 | 4.0 | 5.4 |
| Melbourne | 5.0 | 5.5 | 5.4 | 5.3 | 5.0 | 4.8 | 5.0 | 4.7 | 4.3 | 4.5 | 3.9 | 5.2 |
| Brisbane .. | 4.9 | 5.4 | 5.7 | 5.0 | 4.8 | 4.9 | 4.9 | 5.1 | 4.9 | 4.3 | 4.3 | 5.1 |
| Adelaide .. | 5.5 | 5.2 | 4.9 | 4.7 | 4.9 | 4.9 | 4.7 | 4.7 | 4.7 | 4.4 | 4.4 | 5.1 |
| Perth .. | 6.3 | 7.3 | 7.0 | 7.2 | 7.5 | 7.0 | 7.1 | 6.9 | 6.9 | 7.1 | 7.3 | 8.0 |
| Hobart .. | 5.7 | 6.1 | 6.0 | 5.8 | 5.8 | 5.8 | 6.1 | 5.8 | 5.8 | 5.8 | 5.8 | 6.1 |
| CHOPS, LEG, PER LB. | | | | | | | | | | | | |
| Sydney .. | 4.1 | 5.4 | 4.7 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.1 | 3.9 | 4.7 |
| Melbourne | 4.5 | 4.9 | 4.8 | 4.8 | 4.5 | 4.3 | 4.3 | 4.2 | 3.9 | 4.0 | 3.8 | 4.7 |
| Brisbane .. | 4.9 | 5.4 | 5.4 | 5.0 | 4.9 | 4.9 | 4.9 | 5.1 | 4.9 | 4.3 | 4.3 | 5.1 |
| Adelaide .. | 5.7 | 5.4 | 5.1 | 4.9 | 5.1 | 5.1 | 4.9 | 4.9 | 4.9 | 4.6 | 4.6 | 5.3 |
| Perth .. | 6.5 | 7.6 | 7.3 | 7.5 | 7.7 | 7.3 | 7.6 | 7.1 | 7.1 | 7.4 | 7.4 | 8.1 |
| Hobart .. | 5.2 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.7 | 5.3 | 6.0 |
| CHOPS, NECK, PER LB. | | | | | | | | | | | | |
| Sydney .. | 3.6 | 3.9 | 3.7 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.1 | 3.0 | 4.1 |
| Melbourne | 3.2 | 3.6 | 3.4 | 3.4 | 3.1 | 2.9 | 3.0 | 2.9 | 2.9 | 2.9 | 3.0 | 3.5 |
| Brisbane .. | 5.0 | 5.5 | 5.6 | 5.2 | 5.0 | 5.1 | 5.1 | 5.3 | 5.1 | 4.5 | 4.4 | 5.1 |
| Adelaide .. | 4.3 | 4.1 | 3.8 | 3.6 | 3.8 | 3.8 | 3.6 | 3.6 | 3.6 | 3.5 | 3.5 | 4.3 |
| Perth .. | 6.0 | 7.2 | 6.8 | 7.1 | 7.4 | 6.8 | 7.1 | 6.7 | 6.7 | 7.2 | 7.2 | 6.7 |
| Hobart .. | 4.7 | 5.0 | 4.9 | 4.9 | 4.9 | 4.9 | 5.0 | 4.9 | 4.9 | 5.1 | 4.9 | 4.8 |
| PORK, LEG, PER LB. | | | | | | | | | | | | |
| Sydney .. | 7.0 | 6.7 | 6.7 | 6.7 | 6.7 | 6.7 | 7.4 | 7.9 | 8.1 | 8.6 | 8.6 | 7.8 |
| Melbourne | 5.4 | 6.4 | 6.2 | 5.7 | 5.2 | 5.0 | 5.5 | 5.5 | 6.2 | 5.7 | 5.2 | 6.4 |
| Brisbane .. | 5.8 | 6.4 | 7.0 | 6.0 | 5.8 | 5.9 | 5.4 | 5.4 | 5.8 | 5.8 | 6.3 | 7.0 |
| Adelaide .. | 7.3 | 7.3 | 7.0 | 6.9 | 7.0 | 6.6 | 5.9 | 6.4 | 6.4 | 6.4 | 6.4 | 7.1 |
| Perth .. | 7.9 | 8.1 | 7.9 | 8.1 | 8.4 | 8.4 | 8.5 | 8.7 | 8.6 | 8.1 | 8.1 | 8.9 |
| Hobart. .. | 6.4 | 6.2 | 6.3 | 6.2 | 6.0 | 6.1 | 6.5 | 6.3 | 6.0 | 6.5 | 6.1 | 6.2 |
| PORK, LOIN, PER LB. | | | | | | | | | | | | |
| Sydney .. | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.8 | 7.3 | 7.5 | 8.0 | 8.0 | 8.2 |
| Melbourne | 6.4 | 7.4 | 7.0 | 6.6 | 6.0 | 6.0 | 6.4 | 6.6 | 7.0 | 6.5 | 6.0 | 7.1 |
| Brisbane .. | 6.3 | 6.9 | 7.5 | 7.0 | 6.4 | 6.6 | 6.4 | 6.6 | 6.8 | 6.8 | 7.3 | 7.2 |
| Adelaide .. | 7.7 | 7.7 | 7.3 | 7.2 | 7.3 | 6.9 | 6.7 | 7.2 | 7.2 | 7.2 | 7.2 | 7.9 |
| Perth .. | 6.9 | 7.2 | 6.9 | 7.2 | 7.4 | 7.4 | 7.9 | 7.8 | 7.7 | 7.2 | 7.2 | 9.0 |
| Hobart .. | 6.6 | 6.6 | 6.9 | 6.8 | 6.6 | 6.6 | 6.6 | 6.9 | 6.6 | 6.6 | 6.7 | 6.5 |
| PORK, BELLY, PER LB. | | | | | | | | | | | | |
| Sydney .. | 5.5 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 | 6.5 | 7.1 | 7.3 | 7.5 | 7.5 | 7.6 |
| Melbourne | 6.2 | 7.3 | 7.0 | 6.6 | 6.1 | 6.0 | 6.4 | 6.6 | 7.0 | 6.5 | 6.1 | 6.9 |
| Brisbane .. | 5.0 | 5.5 | 6.0 | 5.7 | 5.5 | 5.1 | 5.2 | 5.4 | 5.7 | 5.5 | 6.5 | 6.0 |
| Adelaide .. | 7.6 | 7.6 | 7.2 | 7.1 | 7.2 | 6.9 | 6.6 | 7.1 | 7.1 | 7.1 | 7.1 | 7.8 |
| Perth .. | 7.0 | 7.3 | 7.0 | 7.3 | 7.5 | 7.5 | 7.9 | 7.8 | 7.6 | 7.1 | 7.1 | 8.1 |
| Hobart .. | 6.7 | 7.0 | 6.7 | 6.9 | 6.6 | 6.9 | 6.9 | 6.7 | 6.5 | 6.6 | 6.7 | 6.5 |
| PORK, CHOPS, PER LB. | | | | | | | | | | | | |
| Sydney .. | 7.0 | 6.7 | 6.7 | 6.7 | 6.7 | 6.7 | 7.4 | 7.9 | 8.1 | 8.6 | 8.6 | 8.7 |
| Melbourne | 7.0 | 8.1 | 7.6 | 7.2 | 6.6 | 6.4 | 7.0 | 7.2 | 7.6 | 7.1 | 6.6 | 7.3 |
| Brisbane .. | 6.7 | 7.3 | 8.1 | 7.0 | 6.7 | 6.8 | 6.6 | 6.8 | 7.0 | 7.2 | 7.7 | 7.9 |
| Adelaide .. | 8.0 | 8.0 | 7.8 | 7.8 | 7.8 | 7.3 | 6.8 | 7.3 | 7.3 | 7.3 | 7.3 | 8.0 |
| Perth .. | 8.6 | 8.7 | 8.5 | 8.7 | 9.0 | 9.0 | 9.1 | 9.4 | 9.3 | 8.7 | 8.7 | 9.6 |
| Hobart .. | 7.4 | 7.5 | 7.4 | 6.8 | 6.7 | 6.8 | 7.1 | 6.9 | 7.2 | 6.8 | 6.8 | 7.0 |

* First 9 months of 1912.

# APPENDIX III.

## Current Retail Prices in Metropolitan and Country Towns, 1912.*

| Town. | Bread 2 lbs. | Flour 25 lbs. | Tea per lb. | Coffee per lb. | Sugar per lb. | Rice per lb. | Sago per lb. | Jam per lb. | Oat-meal per lb. | Rais-ins per lb. | Cur-rants per lb. | Starch per lb. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *d.* | *s. d.* | *s. d.* | *s. d.* | *d.* | *d.* | *d.* | *d.* | *d.* | *d.* | *d.* | *d.* |
| Sydney .. | 3.3 | 2 10.4 | 1 4.0 | 1 6.2 | 2.8 | 2.8 | 3.0 | 4.4 | 3.0 | 6.2 | 7.3 | 5.6 |
| Newcastle | 3.0 | 2 11.0 | 1 5.4 | 1 5.6 | 2.9 | 3.2 | 3.2 | 4.4 | 2.9 | 7.0 | 7.5 | 5.6 |
| Broken Hill | 3.5 | 2 11.7 | 1 6.2 | 1 7.8 | 3.3 | 4.0 | 4.1 | 4.5 | 3.5 | 7.1 | 7.4 | 6.9 |
| Goulburn .. | 3.2 | 2 9.9 | 1 5.9 | 1 6.6 | 3.0 | 3.1 | 3.7 | 4.6 | 3.1 | 7.6 | 7.7 | 6.0 |
| Bathurst .. | 3.5 | 2 6.7 | 1 5.8 | 1 6.0 | 3.1 | 3.0 | 3.4 | 4.9 | 3.0 | 7.2 | 7.1 | 6.1 |
| Melbourne | 3.0 | 2 6.7 | 1 2.7 | 1 6.6 | 3.0 | 2.8 | 2.9 | 4.0 | 2.7 | 6.3 | 7.1 | 5.3 |
| Ballarat .. | 3.1 | 2 6.4 | 1 3.0 | 1 5.9 | 3.0 | 2.9 | 2.9 | 3.6 | 2.7 | 5.8 | 6.7 | 5.4 |
| Bendigo .. | 3.2 | 2 6.0 | 1 2.2 | 1 6.1 | 3.2 | 2.9 | 3.0 | 3.5 | 2.8 | 5.8 | 7.0 | 5.3 |
| Geelong .. | 3.2 | 2 9.4 | 1 2.6 | 1 5.2 | 3.0 | 2.6 | 3.0 | 3.7 | 2.9 | 6.2 | 7.5 | 5.1 |
| Warrnambool | 3.3 | 2 8.3 | 1 3.2 | 1 6.1 | 2.9 | 2.7 | 3.0 | 3.8 | 2.8 | 6.3 | 6.9 | 5.8 |
| Brisbane .. | 3.5 | 3 1.7 | 1 4.3 | 1 7.1 | 3.0 | 2.6 | 2.8 | 3.9 | 2.8 | 6.4 | 7.2 | 5.5 |
| Toowoomba | 3.5 | 3 4.0 | 1 6.0 | 1 5.9 | 3.1 | 3.0 | 3.2 | 4.8 | 3.0 | 7.1 | 7.7 | 6.0 |
| Rockhampt'n | 3.8 | 3 0.9 | 1 6.0 | 1 6.6 | 2.8 | 2.8 | 3.0 | 4.4 | 2.9 | 6.2 | 7.0 | 6.0 |
| Charters Towers | 4.5 | 3 7.2 | 1 7.6 | 1 7.8 | 3.5 | 3.7 | 4.0 | 4.8 | 3.3 | 6.8 | 7.7 | 6.0 |
| Warwick .. | 3.7 | 3 3.9 | 1 6.1 | 1 6.0 | 3.1 | 3.0 | 3.4 | 4.8 | 3.1 | 8.2 | 7.6 | 6.0 |
| Adelaide .. | 3.5 | 2 9.1 | 1 4.4 | 1 5.9 | 2.9 | 3.3 | 3.2 | 3.4 | 2.8 | 6.2 | 6.7 | 5.5 |
| Kadina Moonta & Wallaroo .. | 3.3 | 2 6.1 | 1 3.4 | 1 6.2 | 2.9 | 3.1 | 3.1 | 3.5 | 2.8 | 6.6 | 6.6 | 5.9 |
| Port Pirie | 3.0 | 2 9.1 | 1 6.0 | 1 7.9 | 3.3 | 3.4 | 3.7 | 3.9 | 3.1 | 7.1 | 7.5 | 6.2 |
| Mt. Gambier | 3.0 | 2 9.9 | 1 4.2 | 1 7.7 | 3.0 | 3.0 | 3.2 | 4.0 | 2.9 | 6.6 | 7.1 | 5.7 |
| Petersburg | 3.4 | 2 11.2 | 1 5.6 | 1 7.5 | 3.2 | 3.5 | 3.0 | 4.2 | 3.0 | 7.4 | 6.9 | 6.2 |
| Perth and Fremantle | 3.5 | 2 8.4 | 1 3.8 | 1 7.2 | 3.0 | 2.9 | 3.0 | 4.1 | 2.9 | 6.4 | 7.0 | 5.9 |
| Kalgoorlie & Boulder | 5.0 | 3 3.1 | 1 7.3 | 1 9.4 | 3.8 | 3.9 | 4.0 | 5.2 | 3.4 | 9.3 | 8.1 | 7.0 |
| Mid. Junction & Guildford | 3.5 | 2 9.0 | 1 3.8 | 1 6.0 | 3.0 | 2.9 | 3.0 | 4.0 | 3.0 | 6.0 | 7.3 | 6.0 |
| Bunbury .. | 3.5 | 2 10.6 | 1 3.7 | 1 6.0 | 3.2 | 3.1 | 3.1 | 4.2 | 2.9 | 6.7 | 7.3 | 6.1 |
| Geraldton | 4.0 | 2 11.1 | 1 5.4 | 1 3.4 | 3.3 | 3.0 | 4.0 | 4.3 | 3.0 | 7.8 | 7.9 | 6.0 |
| Hobart .. | 3.5 | 3 0.5 | 1 3.4 | 1 6.0 | 3.0 | 3.0 | 3.2 | 4.2 | 2.8 | 6.3 | 7.7 | 6.0 |
| Launceston | 3.3 | 2 7.4 | 1 2.5 | 1 5.2 | 2.7 | 2.9 | 2.8 | 3.9 | 2.5 | 6.1 | 7.1 | 5.4 |
| Zeehan .. | 3.7 | 2 11.3 | 1 4.2 | 1 6.1 | 3.0 | 3.0 | 3.2 | 4.2 | 2.9 | 6.6 | 7.1 | 5.5 |
| Beaconsfield | 3.2 | 2 10.6 | 1 2.8 | 1 5.8 | 3.0 | 3.0 | 3.4 | 4.3 | 2.8 | 7.5 | 7.1 | 5.9 |
| Queenstown | 3.7 | 3 0.2 | 1 5.6 | 1 4.7 | 2.9 | 3.0 | 3.1 | 4.0 | 2.7 | 7.6 | 7.8 | 5.7 |
| **Weighted Average ..** | **3.3** | **2 9.4** | **1 3.8** | **1 6.4** | **3.0** | **2.9** | **3.0** | **4.1** | **2.9** | **6.4** | **7.2** | **5.6** |

* Average prices for first 9 months only.

Current Retail Prices in Metropolitan and Country Towns, 1912.*—contd.

| TOWN. | Blue. dz. sq. | Candle per lb. | Soap per lb. | Potatoes. 14 lbs. | Onions per lb. | Kerosene gallon | Milk quart | Butter per lb. | Cheese per lb. | Eggs per dz | Bacon Middle per lb. | Bacon Shoulder. per lb. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | s. d. | d. | d. | s. d. | d. | s. d. | d. | s. d. | s. d. | s. d. | s. d. | d. |
| Sydney .. | 8.9 | 6.6 | 3.0 | 1 6.9 | 2.1 | 1 0.8 | 5.0 | 1 3.6 | 11.7 | 1 8.1 | 10.5 | 6.8 |
| Newcastle | 10.0 | 7.0 | 3.6 | 1 7.5 | 2.5 | 1 2.1 | 4.3 | 1 3.7 | 11.7 | 1 8.3 | 10.8 | 9.5 |
| Broken Hill | 1 0.7 | 8.5 | 3.2 | 1 8.8 | 2.8 | 1 9.6 | 6.2 | 1 8.3 | 1 0.5 | 1 6.4 | 11.3 | 9.1 |
| Goulburn .. | 11.2 | 6.4 | 3.2 | 1 3.7 | 2.6 | 1 3.2 | 4.9 | 1 3.9 | 11.5 | 1 5.9 | 10.6 | 7.8 |
| Bathurst .. | 11.2 | 7.3 | 2.9 | 1 2.4 | 2.3 | 1 5.3 | 4.4 | 1 3.7 | 11.7 | 1 5.9 | 11.4 | 9.0 |
| Melbourne | 6.6 | 6.4 | 3.6 | 1 1.9 | 2.0 | 1 0.3 | 4.8 | 1 4.2 | 11.1 | 1 6.6 | 11.8 | 6.8 |
| Ballarat .. | 6.3 | 5.9 | 2.9 | 11.9 | 2.0 | 1 1.5 | 3.9 | 1 3.1 | 10.9 | 1 2.9 | 11.5 | 6.9 |
| Bendigo .. | 6.4 | 6.6 | 3.1 | 1 3.3 | 2.1 | 1 2.5 | 4.8 | 1 3.6 | 11.3 | 1 3.7 | 10.2 | 6.2 |
| Geelong .. | 6.3 | 6.0 | 3.0 | 1 1.6 | 1.9 | 1 2.6 | 4.5 | 1 3.4 | 10.7 | 1 4.4 | 11.3 | 6.9 |
| Warrnambool | 7.1 | 6.2 | 2.9 | 1 1.3 | 1.7 | 1 1.3 | 4.0 | 1 4.2 | 10.6 | 1 3.2 | 10.4 | 6.8 |
| Brisbane .. | 8.3 | 6.6 | 2.4 | 1 9.9 | 2.1 | 1 0.5 | 4.8 | 1 3.0 | 11.2 | 1 6.9 | 10.3 | 7.1 |
| Toowoomba | 10.0 | 7.2 | 3.0 | 1 10.6 | 2.4 | 1 4.9 | 4.2 | 1 3.4 | 11.0 | 1 5.7 | 9.9 | 7.5 |
| Rockhampt'n | 9.5 | 6.9 | 2.5 | 1 9.8 | 2.3 | 1 1.5 | 4.9 | 1 2.5 | 11.8 | 1 7.3 | 9.3 | 7.6 |
| Charters Towers | 10.3 | 7.8 | 2.8 | 2 4.3 | 2.9 | 1 6.3 | 4.8 | 1 5.5 | 1 0.7 | 1 9.3 | 11.5 | 8.8 |
| Warwick .. | 11.6 | 7.3 | 2.9 | 1 9.6 | 2.7 | 1 6.0 | 4.2 | 1 3.6 | 10.9 | 1 4.6 | 10.0 | 8.4 |
| Adelaide .. | 9.3 | 7.1 | 2.6 | 1 4.3 | 2.3 | 1 2.0 | 5.9 | 1 5.8 | 11.5 | 1 3.9 | 10.9 | 6.5 |
| Kadina Moonta & Wallaroo .. | 9.6 | 7.3 | 3.1 | 1 4.8 | 2.5 | 1 3.2 | 6.0 | 1 5.2 | 11.6 | 1 2.0 | 10.7 | 9.2 |
| Port Pirie | 11.6 | 8.5 | 2.5 | 1 5.3 | 2.6 | 1 4.1 | 5.8 | 1 5.9 | 1 0.8 | 1 2.8 | 11.7 | 9 3 |
| Mt. Gambier | 11.4 | 7.8 | 3.0 | 1 1.9 | 2.2 | 1 3 8 | 3.4 | 1 2.5 | 10.1 | 1 0.1 | 10.6 | 8.1 |
| Petersburg | 11.7 | 7.9 | 3.5 | 1 5.4 | 2.8 | 1 5.0 | 4.4 | 1 4.4 | 11.6 | 1 2.0 | 11.5 | 9.8 |
| Perth and Fremantle | 10.9 | 7.4 | 2.9 | 1 9.8 | 2.4 | 1 0.5 | 6.9 | 1 4.9 | 11.9 | 1 10.4 | 1 0.3 | 7.8 |
| Kalgoorlie & Boulder | 1 0.0 | 9.5 | 4.3 | 2 3.6 | 3.3 | 1 9.7 | 9.0 | 1 7.3 | 1 1.5 | 2 2.4 | 1 1.7 | 9.6 |
| Mid. Junction & Guildford | 10.8 | 8.2 | 3.1 | 2 0.0 | 2.7 | 1 0.5 | 6.0 | 1 5.5 | 1 0.1 | 1 10.1 | 1 0.3 | 8.7 |
| Bunbury .. | 11.2 | 8.5 | 2.7 | 1 10.7 | 2.8 | 1 1.0 | 5.5 | 1 5.7 | 1 0.1 | 1 8.9 | 1 0.0 | 8.4 |
| Geraldton | 1 0.0 | 8.7 | 2.7 | 2 1.0 | 2.4 | 1 2.3 | 6.0 | 1 7.0 | 1 0.9 | 1 11.7 | 1 1.3 | 9.6 |
| Hobart .. | 9.0 | 5.9 | 3.2 | 1 3.8 | 2.5 | 1 2.7 | 5.0 | 1 4.2 | 11.5 | 1 5.6 | 10.7 | 6.8 |
| Launceston | 7.3 | 5.7 | 2.8 | 1 3.7 | 2.2 | 1 3.4 | 4.6 | 1 3.3 | 10.5 | 1 4.0 | 10.0 | 7.7 |
| Zeehan .. | 9.1 | 7.0 | 3.1 | 1 7.3 | 2.3 | 1 3.2 | 5.6 | 1 5.0 | 11.5 | 1 7.2 | 10.0 | 7.8 |
| Beaconsfield | 9.4 | 7.2 | 4.2 | 1 4.0 | 2.5 | 1 3.4 | 4.8 | 1 4.1 | 10.9 | 1 4.8 | 9.7 | 8.2 |
| Queenstown | 8.7 | 7.7 | 3.3 | 1 6.4 | 2.1 | 1 5.4 | 5.6 | 1 4.3 | 10.6 | 1 7.2 | 10.0 | 8.2 |
| **Weighted Average ..** | **8.4** | **6.7** | **3.1** | **1 5.4** | **2.2** | **1 1.4** | **5.1** | **1 4.2** | **11.5** | **1 6.9** | **11.1** | **7.1** |

* Average prices for first 9 months only.

Current Retail Prices in Metropolitan and Country Towns, 1912.*—contd.

| TOWN. | Ham | Beef Fresh Sirloin | Beef Fresh Rib | Beef Fresh Flank | Beef Fresh Shin | Steak Rump | Steak sh'lder | Steak But-tock | Beef Co'n'd round | Beef Co'n'd brisket with bone | Beef Co'n'd brisket with-out bone | Mutt'n Leg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | per lb. | per lb. | per lb. | per lb. | per lb. | per lb. | per lb. | per lb. | per lb. | per lb. | per lb. | per lb. |
| | *s. d.* | *d.* | *d.* | *d.* | *d.* | *s. d.* | *d.* | *d.* | *d.* | *d.* | *d.* | *d.* |
| Sydney .. | 11.5 | 5.9 | 4.7 | 3.9 | 3.4 | 8.2 | 4.1 | 4.2 | 4.5 | 3.0 | 3.9 | 4.0 |
| Newcastle | 11.9 | 5.7 | 5.0 | 3.9 | 3.8 | 7.3 | 4.3 | 4.4 | 4.7 | 3.6 | 5.0 | 4.9 |
| Broken Hill | 1 0.6 | 6.6 | 5.6 | 3.9 | 5.2 | 10.0 | 6.2 | 6.6 | 6.6 | 4.2 | 5.6 | 6.1 |
| Goulburn .. | 11.5 | 5.2 | 4.2 | 3.8 | 3.5 | 6.1 | 4.2 | 4.2 | 5.2 | 3.9 | 4.8 | 4.2 |
| Bathurst .. | 1 0.6 | 4.4 | 3.9 | 3.2 | 3.3 | 5.9 | 3.8 | 4.0 | 4.1 | 3.3 | 3.8 | 4.1 |
| Melbourne | 1 0.2 | 6.2 | 5.0 | 4.0 | 3.6 | 8.7 | 4.4 | 5.0 | 5.1 | 3.1 | 4.1 | 4.2 |
| Ballarat .. | 1 0.2 | 7.0 | 6.1 | 4.9 | 4.4 | 9.7 | 5.6 | 5.9 | 6.9 | 4.2 | 5.9 | 4.9 |
| Bendigo .. | 11.3 | 5.6 | 5.2 | 3.6 | 4.2 | 8.0 | 5.0 | 5.3 | 5.3 | 3.5 | 4.7 | 4.8 |
| Geelong .. | 11.8 | 5.8 | 5.4 | 4.0 | 3.8 | 7.8 | 4.3 | 5.2 | 5.5 | 3.3 | 4.4 | 4.4 |
| Warrnambool | 11.1 | 5.5 | 4.8 | 3.3 | 4.1 | 6.9 | 4.0 | 4.8 | 4.9 | 3.1 | 4.0 | 4.9 |
| Brisbane .. | 1 2.1 | 4.4 | 3.3 | 3.4 | 3.0 | 6.4 | 3.8 | 3.7 | 4.4 | 2.9 | 3.9 | 4.6 |
| Toowoomba | 1 2.4 | 4.9 | 3.1 | 2.1 | 2.5 | 5.8 | 2.9 | 2.9 | 4.4 | 2.5 | 3.9 | 4.5 |
| Rockhampt'n | 1 2.9 | 5.7 | 4.8 | 3.4 | 2.9 | 5.9 | 4.0 | 3.7 | 5.0 | 3.9 | 4.6 | 5.3 |
| Charters Towers | 1 3.8 | 5.0 | 3.5 | 3.5 | 4.0 | 6.0 | 4.0 | 4.0 | 4.5 | 3.5 | 4.5 | 5.5 |
| Warwick .. | 1 2.5 | 5.0 | 4.0 | 4.0 | 4.0 | 5.0 | 4.0 | 4.0 | 5.0 | 4.0 | 4.4 | 5.0 |
| Adelaide .. | 11.7 | 5.8 | 4.8 | 4.2 | 3.7 | 8.1 | 4.5 | 4.9 | 5.7 | 3.6 | 4.5 | 4.4 |
| Kadina Moonta & Wallaroo .. | 11.4 | 5.6 | 5.4 | 3.9 | 4.5 | 7.0 | 5.4 | 5.4 | 5.6 | 4.2 | 5.0 | 4.6 |
| Port Pirie | 1 0.7 | 5.9 | 4.9 | 3.1 | 4.4 | 7.9 | 5.4 | 5.6 | 6.0 | 4.0 | 4.9 | 4.9 |
| Mt. Gambier | 11.8 | 5.2 | 4.6 | 3.6 | 4.0 | 5.9 | 4.0 | 4.0 | 5.2 | 4.0 | 5.0 | 4.1 |
| Petersburg | 1 0.9 | 5.3 | 5.0 | 4.8 | 4.7 | 7.1 | 5.0 | 5.0 | 5.5 | 4.1 | 4.9 | 4.9 |
| Perth and Fremantle | 1 1.4 | 7.7 | 6.6 | 6.1 | 5.9 | 11.8 | 7.2 | 7.2 | 7.0 | 4.6 | 6.0 | 7.9 |
| Kalgoorlie & Boulder | 1 4.6 | 8.9 | 7.8 | 6.8 | 8.7 | 11.9 | 8.6 | 8.7 | 8.7 | 6.3 | 8.1 | 8.9 |
| Mid. Junction & Guildford | 1 1.4 | 8.3 | 7.5 | 4.9 | 7.0 | 1 0.5 | 8.0 | 7.8 | 7.6 | 5.4 | 6.6 | 8.3 |
| Bunbury .. | 1 1.0 | 9.0 | 8.0 | 5.7 | 7.2 | 1 0.0 | 8.1 | 8.1 | 8.3 | 6.1 | 7.3 | 9.0 |
| Geraldton | 1 2.5 | 7.6 | 6.6 | 4.9 | 6.3 | 9.1 | 6.9 | 7.2 | 7.2 | 5.7 | 6.4 | 7.6 |
| Hobart .. | 1 0.8 | 6.4 | 5.4 | 3.9 | 4.5 | 8.4 | 5.3 | 6.0 | 5.9 | 3.5 | 4.4 | 5.3 |
| Launceston | 11.8 | 6.1 | 5.5 | 3.8 | 4.8 | 7.0 | 5.2 | 5.7 | 5.7 | 3.8 | 5.2 | 5.2 |
| Zeehan .. | 11.4 | 6.8 | 6.6 | 5.4 | 5.9 | 8.0 | 6.4 | 6.8 | 6.8 | 5.8 | 6.5 | 6.9 |
| Beaconsfield | 1 0.0 | 6.2 | 5.6 | 4.4 | 5.5 | 6.9 | 6.1 | 6.1 | 5.4 | 4.3 | 5.3 | 5.4 |
| Queenstown | 11.9 | 7.0 | 6.5 | 4.5 | 5.7 | 8.2 | 6.5 | 6.9 | 6.8 | 4.7 | 5.7 | 6.6 |
| **Weighted Average ..** | **1 0.1** | **6.0** | **4.9** | **4.1** | **3.8** | **8.4** | **4.6** | **4.9** | **5.2** | **3.4** | **4.4** | **4.6** |

* Average prices for first 9 months only.

Current Retail Prices in Metropolitan and Country Towns, 1912.*—contd.

| TOWN. | Mutt'n sh'lder per lb. | Mutt'n Loin per lb. | Mutt'n Neck per lb. | Chops Loin per lb. | Chops Leg per lb. | Chops Neck per lb. | Pork Leg per lb. | Pork Loin per lb. | Pork Belly per lb. | Pork Chops per lb. |
|---|---|---|---|---|---|---|---|---|---|---|
| | *d.* | *d.* | *d.* | *d.* | *d.* | *d.* | *d.* | *d.* | *d.* | *d.* |
| Sydney .. | 3.4 | 4.5 | 3.6 | 5.4 | 4.7 | 4.1 | 7.8 | 8.2 | 7.6 | 8.7 |
| Newcastle | 4.1 | 4.7 | 4.0 | 4.9 | 5.1 | 4.3 | 6.4 | 7.7 | 6.3 | 7.8 |
| Broken Hill | 5.1 | 5.5 | 4.4 | 6.3 | 6.3 | 5.8 | 9.1 | 9.1 | 8.3 | 9.9 |
| Goulburn .. | 3.6 | 4.2 | 2.9 | 4.2 | 4.2 | 3.0 | 5.8 | 6.0 | 5.6 | 6.0 |
| Bathurst .. | 3.5 | 4.0 | 2.8 | 4.1 | 4.2 | 3.6 | 5.8 | 6.1 | 5.9 | 6.2 |
| Melbourne | 3.4 | 4.2 | 3.0 | 5.2 | 4.7 | 3.5 | 6.4 | 7.1 | 6.9 | 7.3 |
| Ballarat .. | 4.0 | 5.1 | 3.5 | 5.5 | 5.9 | 4.3 | 7.3 | 8.1 | 8.3 | 8.2 |
| Bendigo .. | 3.5 | 4.7 | 3.3 | 5.3 | 5.3 | 4.2 | 6.3 | 6.6 | 6.6 | 7.0 |
| Geelong .. | 3.6 | 4.5 | 3.5 | 4·8 | 4.8 | 3.8 | 6.6 | 7.2 | 7.1 | 7.4 |
| Warrnambool | 4.0 | 4.9 | 3.6 | 5.1 | 5.0 | 4.0 | 6.0 | 6.3 | 6.1 | 6.5 |
| Brisbane .. | 3.1 | 4.8 | 4.3 | 5.1 | 5.1 | 5.1 | 7.0 | 7.2 | 6.0 | 7.9 |
| Toowoomba | 2.8 | 4.5 | 3·7 | 4.9 | 4.9 | 4.9 | 6.1 | 6.1 | 5.8 | 6.3 |
| Rockhampt'n | 3.9 | 5.3 | 4.0 | 5.4 | 5.3 | 5.2 | 7.3 | 7.3 | 6.4 | 7.4 |
| Charters Towers | 4.0 | 5.6 | 3.9 | 6.0 | 6.0 | 5.3 | 8.0 | 8.0 | 6.9 | 8.0 |
| Warwick .. | 4.1 | 5.0 | 4.7 | 5.0 | 5.0 | 4.9 | 7.0 | 7.0 | 7.0 | 7.0 |
| Adelaide .. | 3.6 | 4.5 | 3.4 | 5.1 | 5.3 | 4.3 | 7.1 | 7.9 | 7.8 | 8.0 |
| Kadina Moonta & Wallaroo .. | 3.5 | 4.2 | 3.3 | 4.5 | 5.4 | 4.3 | 6.5 | 6.5 | 6.1 | 6.8 |
| Port Pirie | 4.1 | 4.5 | 4.2 | 5.7 | 5.9 | 5.3 | 6.2 | 6.1 | 6.1 | 6.4 |
| Mt. Gambier | 4.0 | 4.6 | 3.5 | 4.9 | 5.0 | 4.4 | 6.0 | 6.1 | 6.1 | 6.1 |
| Petersburg | 4.1 | 4.7 | 3.7 | 5.4 | 5.8 | 4.7 | 6.0 | 6.0 | 5.8 | 6.0 |
| Perth and Fremantle | 6.7 | 7.4 | 5.9 | 8.0 | 8.1 | 6.7 | 8.9 | 9.0 | 8.1 | 9.6 |
| Kalgoorlie & Boulder | 7.3 | 8.4 | 7.0 | 8.7 | 9.0 | 8.3 | 10.7 | 10.5 | 9.2 | 11.6 |
| Mid. Junction & Guildford | 7.3 | 7.5 | 5.9 | 8.4 | 8.4 | 7.0 | 8.7 | 8.7 | 8.0 | 8.9 |
| Bunbury .. | 8.0 | 8.7 | 7.1 | 9.0 | 9.0 | 7.8 | 9.0 | 9.0 | 9.0 | 9.4 |
| Geraldton | 6.6 | 6.8 | 5.8 | 7.6 | 7.6 | 6.9 | 8.0 | 8.0 | 6.5 | 8.0 |
| Hobart .. | 4.4 | 5.1 | 4.0 | 6.1 | 6.0 | 4.8 | 6.2 | 6.5 | 6.5 | 7.0 |
| Launceston | 4.8 | 5.1 | 3.9 | 6.0 | 5.9 | 5.0 | 6.1 | 6.3 | 6.3 | 6.5 |
| Zeehan .. | 6.0 | 6.8 | 5.7 | 6.9 | 7.0 | 6.1 | 7.5 | 7.5 | 7.1 | 7.8 |
| Beaconsfield | 5.1 | 5.3 | 4.2 | 6.2 | 6.1 | 5.9 | 6.2 | 6.2 | 6.2 | 6.5 |
| Queenstown | 6.3 | 6.3 | 5.6 | 6.9 | 7.0 | 6.3 | 7.0 | 7.0 | 7.0 | 7.1 |
| **Weighted Average ..** | **3.8** | **4.7** | **3.7** | **5.5** | **5.2** | **4.3** | **7.2** | **7.7** | **7.2** | **8.0** |

* Average prices for first 9 months only.

# APPENDIX IV.

## Weekly House Rents† in Metropolitan Towns, 1901 to 1912.*

| TOWN. | 1901. | | 1902. | | 1903. | | 1904. | | 1905. | | 1906. | | 1907. | | 1908. | | 1909. | | 1910. | | 1911. | | 1912* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sydney | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. |
| Under 4 Rooms | 9 | 0 | 9 | 0 | 9 | 0 | 9 | 0 | 9 | 0 | 9 | 2 | 9 | 2 | 9 | 5 | 10 | 2 | 10 | 5 | 11 | 4 | 11 | 5 |
| 4 ,, | 11 | 1 | 11 | 1 | 11 | 1 | 11 | 3 | 11 | 5 | 11 | 7 | 11 | 10 | 12 | 1 | 12 | 9 | 13 | 3 | 14 | 5 | 15 | 0 |
| 5 ,, | 13 | 7 | 13 | 7 | 13 | 8 | 13 | 10 | 13 | 11 | 14 | 0 | 14 | 8 | 14 | 8 | 14 | 10 | 15 | 4 | 17 | 1 | 17 | 10 |
| 6 ,, | 15 | 4 | 15 | 4 | 15 | 4 | 15 | 4 | 16 | 9 | 16 | 9 | 16 | 11 | 17 | 5 | 18 | 3 | 18 | 7 | 20 | 2 | 21 | 6 |
| 7 ,, | 19 | 1 | 19 | 1 | 19 | 1 | 19 | 1 | 19 | 1 | 19 | 1 | 19 | 5 | 19 | 5 | 20 | 0 | 20 | 11 | 23 | 3 | 26 | 0 |
| Over 7 ,, | 22 | 2 | 22 | 2 | 22 | 2 | 22 | 2 | 22 | 6 | 22 | 6 | 22 | 9 | 22 | 9 | 23 | 0 | 24 | 3 | 26 | 10 | 31 | 9 |
| Weighted Av'ge | 14 | 4 | 14 | 4 | 14 | 4 | 14 | 5 | 14 | 10 | 14 | 10 | 15 | 2 | 15 | 5 | 15 | 11 | 16 | 5 | 18 | 1 | 19 | 5 |
| Melbourne | | | | | | | | | | | | | | | | | | | | | | | | |
| Under 4 Rooms | 6 | 0 | 6 | 3 | 6 | 5 | 6 | 7 | 6 | 7 | 6 | 8 | 6 | 11 | 7 | 2 | 7 | 2 | 7 | 7 | 8 | 3 | 8 | 9 |
| 4 ,, | 7 | 11 | 8 | 2 | 8 | 3 | 8 | 6 | 8 | 6 | 8 | 7 | 8 | 11 | 9 | 2 | 9 | 4 | 10 | 7 | 11 | 3 | 11 | 7 |
| 5 ,, | 10 | 3 | 10 | 6 | 10 | 8 | 11 | 0 | 11 | 0 | 11 | 1 | 11 | 6 | 12 | 2 | 12 | 3 | 13 | 6 | 14 | 4 | 14 | 5 |
| 6 ,, | 13 | 2 | 13 | 3 | 13 | 1 | 13 | 4 | 13 | 9 | 13 | 11 | 14 | 3 | 14 | 8 | 14 | 10 | 16 | 4 | 17 | 1 | 18 | 0 |
| 7 ,, | 15 | 8 | 15 | 9 | 15 | 11 | 16 | 0 | 16 | 3 | 16 | 9 | 17 | 3 | 17 | 4 | 17 | 9 | 19 | 5 | 20 | 7 | 21 | 5 |
| Over 7 ,, | 20 | 1 | 20 | 2 | 20 | 0 | 20 | 7 | 20 | 5 | 20 | 10 | 21 | 3 | 21 | 5 | 22 | 0 | 22 | 6 | 24 | 1 | 25 | 2 |
| Weighted Av'ge | 11 | 5 | 11 | 7 | 11 | 8 | 11 | 11 | 12 | 0 | 12 | 3 | 12 | 7 | 12 | 11 | 13 | 2 | 14 | 4 | 15 | 2 | 15 | 8 |
| Brisbane | | | | | | | | | | | | | | | | | | | | | | | | |
| Under 4 Rooms | 3 | 0 | 3 | 0 | 3 | 0 | 3 | 3 | 3 | 4 | 3 | 8 | 4 | 0 | 4 | 4 | 4 | 7 | 4 | 11 | 5 | 5 | 6 | 1 |
| 4 ,, | 4 | 6 | 4 | 6 | 4 | 6 | 4 | 9 | 4 | 9 | 5 | 4 | 5 | 4 | 5 | 10 | 6 | 4 | 6 | 4 | 6 | 11 | 8 | 1 |
| 5 ,, | 5 | 6 | 5 | 6 | 5 | 6 | 5 | 9 | 5 | 11 | 6 | 4 | 7 | 0 | 7 | 7 | 8 | 2 | 8 | 5 | 9 | 4 | 10 | 4 |
| 6 ,, | 7 | 8 | 7 | 11 | 8 | 7 | 8 | 7 | 8 | 10 | 8 | 0 | 9 | 2 | 9 | 11 | 10 | 9 | 11 | 8 | 13 | 2 | 13 | 9 |
| 7 ,, | 11 | 4 | 11 | 4 | 11 | 10 | 11 | 4 | 11 | 7 | 11 | 10 | 13 | 1 | 13 | 7 | 14 | 5 | 15 | 7 | 16 | 7 | 16 | 11 |
| Over 7 ,, | 14 | 11 | 14 | 11 | 14 | 11 | 14 | 7 | 14 | 9 | 14 | 10 | 16 | 2 | 17 | 3 | 18 | 4 | 19 | 6 | 20 | 10 | 23 | 0 |
| Weighted Av'ge | 7 | 8 | 7 | 8 | 7 | 11 | 7 | 11 | 8 | 1 | 8 | 2 | 9 | 0 | 9 | 7 | 10 | 4 | 10 | 11 | 12 | 0 | 12 | 7 |
| Adelaide | | | | | | | | | | | | | | | | | | | | | | | | |
| Under 4 Rooms | 4 | 9 | 4 | 9 | 4 | 9 | 4 | 9 | 5 | 5 | 6 | 2 | 6 | 7 | 7 | 3 | 8 | 0 | 8 | 10 | 9 | 7 | 9 | 11 |
| 4 ,, | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 8 | 9 | 9 | 1 | 9 | 9 | 10 | 9 | 11 | 5 | 12 | 4 | 13 | 8 | 14 | 1 |
| 5 ,, | 9 | 7 | 9 | 7 | 9 | 7 | 9 | 7 | 10 | 11 | 12 | 1 | 12 | 11 | 13 | 11 | 14 | 10 | 16 | 4 | 17 | 8 | 18 | 8 |
| 6 ,, | 12 | 2 | 12 | 2 | 12 | 2 | 12 | 2 | 13 | 4 | 14 | 4 | 15 | 7 | 16 | 7 | 18 | 4 | 19 | 4 | 21 | 2 | 22 | 2 |
| 7 ,, | 14 | 4 | 14 | 4 | 14 | 4 | 14 | 4 | 15 | 4 | 16 | 8 | 17 | 5 | 18 | 7 | 20 | 3 | 22 | 2 | 23 | 9 | 25 | 9 |
| Over 7 ,, | 16 | 11 | 16 | 11 | 17 | 1 | 17 | 1 | 18 | 4 | 19 | 10 | 20 | 10 | 21 | 9 | 22 | 8 | 24 | 5 | 27 | 3 | 29 | 8 |
| Weighted Av'ge | 9 | 10 | 9 | 10 | 9 | 10 | 9 | 10 | 10 | 11 | 11 | 11 | 12 | 8 | 13 | 7 | 14 | 8 | 15 | 11 | 17 | 4 | 18 | 3 |
| Perth | | | | | | | | | | | | | | | | | | | | | | | | |
| Under 4 Rooms | 8 | 7 | 8 | 7 | 8 | 8 | 8 | 6 | 7 | 8 | 7 | 0 | 7 | 0 | 6 | 11 | 6 | 8 | 7 | 4 | 8 | 7 | 8 | 8 |
| 4 ,, | 10 | 11 | 10 | 10 | 10 | 11 | 10 | 11 | 10 | 2 | 9 | 10 | 9 | 7 | 9 | 4 | 9 | 3 | 9 | 4 | 10 | 10 | 11 | 5 |
| 5 ,, | 12 | 4 | 12 | 1 | 12 | 4 | 12 | 4 | 11 | 7 | 11 | 6 | 11 | 0 | 10 | 11 | 11 | 1 | 11 | 4 | 12 | 10 | 14 | 3 |
| 6 ,, | 16 | 7 | 16 | 7 | 16 | 7 | 16 | 5 | 15 | 2 | 14 | 7 | 13 | 4 | 13 | 6 | 12 | 10 | 14 | 1 | 16 | 8 | 17 | 2 |
| 7 ,, | 18 | 5 | 18 | 5 | 18 | 3 | 18 | 3 | 16 | 6 | 16 | 6 | 14 | 10 | 14 | 10 | 14 | 3 | 15 | 4 | 18 | 3 | 20 | 11 |
| Over 7 ,, | 19 | 7 | 19 | 7 | 19 | 9 | 19 | 9 | 18 | 2 | 18 | 0 | 17 | 2 | 17 | 3 | 17 | 3 | 17 | 3 | 20 | 7 | 27 | 0 |
| Weighted Av'ge | 12 | 6 | 12 | 5 | 12 | 6 | 12 | 6 | 11 | 7 | 11 | 3 | 10 | 8 | 10 | 7 | 10 | 5 | 10 | 10 | 12 | 8 | 13 | 7 |
| Hobart | | | | | | | | | | | | | | | | | | | | | | | | |
| Under 4 Rooms | 5 | 2 | 5 | 2 | 5 | 5 | 5 | 7 | 5 | 7 | 5 | 10 | 5 | 11 | 6 | 1 | 6 | 1 | 6 | 8 | 7 | 7 | 7 | 3 |
| 4 ,, | 8 | 0 | 8 | 0 | 8 | 0 | 8 | 0 | 8 | 0 | 8 | 1 | 8 | 3 | 8 | 6 | 8 | 11 | 9 | 3 | 9 | 5 | 9 | 9 |
| 5 ,, | 9 | 3 | 9 | 3 | 9 | 5 | 9 | 5 | 9 | 10 | 9 | 11 | 10 | 5 | 10 | 8 | 11 | 2 | 11 | 6 | 11 | 10 | 11 | 10 |
| 6 ,, | 10 | 11 | 11 | 0 | 11 | 0 | 11 | 0 | 11 | 0 | 11 | 1 | 11 | 5 | 11 | 11 | 12 | 6 | 12 | 10 | 13 | 7 | 14 | [illegible] |
| 7 ,, | 14 | 7 | 14 | 9 | 14 | 9 | 14 | 9 | 15 | 0 | 15 | 0 | 15 | 7 | 15 | 8 | 15 | 11 | 16 | 2 | 16 | 11 | 17 | 6 |
| Over 7 ,, | 16 | 4 | 16 | 4 | 16 | 4 | 16 | 4 | 16 | 4 | 16 | 4 | 16 | 10 | 17 | 3 | 17 | 3 | 17 | 11 | 18 | 2 | 20 | 8 |
| Weighted Av'ge | 10 | 5 | 10 | 5 | 10 | 6 | 10 | 6 | 10 | 8 | 10 | 9 | 11 | 1 | 11 | 4 | 11 | 8 | 12 | 1 | 12 | 7 | 12 | 10 |

* For the first 9 months. † The rents are shewn to the nearest penny.

# APPENDIX V.

## Current Weekly House Rents† in Metropolitan and Country Towns, 1912.*

| TOWN. | AVERAGE PREDOMINANT WEEKLY RENTS FOR HOUSES HAVING— | | | | | | | | | | | | **Weighted Average for all Houses.** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Under 4 Rooms. | | 4 Rooms. | | 5 Rooms. | | 6 Rooms. | | 7 Rooms. | | Over 7 Rooms. | | | |
| | *s.* | *d.* | *s.* | *d.* | *s.* | *d.* | *s.* | *d.* | *s.* | *d.* | *s.* | *d.* | *s.* | *d.* |
| Sydney .. .. | 11 | 5 | 15 | 0 | 17 | 10 | 21 | 6 | 26 | 0 | 31 | 9 | 19 | 5 |
| Newcastle .. | 5 | 8 | 7 | 5 | 10 | 10 | 13 | 8 | 17 | 5 | 23 | 8 | 10 | 8 |
| Broken Hill .. | 6 | 6 | 9 | 7 | 12 | 3 | 13 | 10 | 17 | 11 | 23 | 3 | 10 | 4 |
| Goulburn .. | 5 | 9 | 7 | 4 | 12 | 6 | 15 | 9 | 22 | 1 | 29 | 7 | 14 | 3 |
| Bathurst .. | 5 | 7 | 7 | 6 | 9 | 5 | 12 | 0 | 16 | 1 | 21 | 8 | 10 | 6 |
| Melbourne .. | 8 | 9 | 11 | 7 | 14 | 5 | 18 | 0 | 21 | 5 | 25 | 2 | 15 | 8 |
| Ballarat .. | 4 | 6 | 5 | 10 | 8 | 2 | 10 | 9 | 13 | 6 | 20 | 5 | 10 | 2 |
| Bendigo .. | 4 | 10 | 7 | 0 | 9 | 2 | 11 | 9 | 14 | 10 | 22 | 4 | 10 | 3 |
| Geelong .. | 4 | 11 | 8 | 8 | 11 | 6 | 15 | 2 | 20 | 8 | 24 | 4 | 13 | 7 |
| Warrnambool .. | 5 | 4 | 8 | 6 | 10 | 10 | 13 | 3 | 15 | 11 | 20 | 6 | 12 | 0 |
| Brisbane .. | 6 | 1 | 8 | 1 | 10 | 4 | 13 | 9 | 16 | 11 | 3 | 0 | 12 | 7 |
| Toowoomba .. | 5 | 0 | 7 | 5 | 10 | 5 | 12 | 5 | 14 | 9 | 22 | 1 | 12 | 8 |
| Rockhampton .. | 5 | 6 | 7 | 5 | 9 | 0 | 11 | 9 | 13 | 11 | 16 | 4 | 10 | 10 |
| Charters Towers | 4 | 10 | 7 | 3 | 10 | 1 | 11 | 10 | 15 | 8 | 20 | 11 | 9 | 5 |
| Warwick .. | 6 | 2 | 8 | 11 | 10 | 11 | 13 | 3 | 16 | 8 | 20 | 1 | 12 | 11 |
| Adelaide .. | 9 | 11 | 14 | 1 | 18 | 8 | 22 | 2 | 25 | 9 | 29 | 8 | 18 | 3 |
| Moonta, &c. .. | 5 | 8 | 7 | 0 | 8 | 6 | 11 | 2 | 14 | 0 | 14 | 7 | 8 | 11 |
| Port Pirie .. | 7 | 11 | 10 | 0 | 11 | 9 | 13 | 8 | 15 | 10 | 18 | 10 | 11 | 4 |
| Mt. Gambier .. | 5 | 6 | 7 | 2 | 9 | 4 | 11 | 6 | 14 | 3 | 17 | 5 | 10 | 1 |
| Petersburg .. | 8 | 0 | 10 | 0 | 12 | 6 | 15 | 0 | 17 | 6 | 20 | 0 | 12 | 7 |
| Perth .. .. | 8 | 8 | 11 | 5 | 14 | 3 | 17 | 2 | 20 | 11 | 27 | 0 | 13 | 7 |
| Kalgoorlie .. | 9 | 8 | 13 | 9 | 17 | 1 | 20 | 6 | 23 | 9 | 32 | 2 | 13 | 4 |
| Mid. Junction | 6 | 4 | 8 | 11 | 12 | 8 | 15 | 9 | 18 | 7 | 24 | 2 | 11 | 7 |
| Bunbury .. | 8 | 4 | 10 | 5 | 12 | 5 | 15 | 3 | 18 | 6 | 21 | 5 | 10 | 6 |
| Geraldton .. | 11 | 7 | 16 | 5 | 20 | 4 | 22 | 8 | 25 | 5 | 34 | 2 | 16 | 10 |
| Hobart .. .. | 7 | 3 | 9 | 9 | 11 | 10 | 14 | 3 | 17 | 6 | 20 | 8 | 12 | 10 |
| Launceston .. | 6 | 6 | 9 | 2 | 11 | 11 | 14 | 7 | 16 | 9 | 21 | 0 | 12 | 9 |
| Zeehan .. .. | 4 | 6 | 6 | 10 | 10 | 2 | 12 | 6 | 14 | 0 | 17 | 6 | 7 | 1 |
| Beaconsfield .. | 3 | 0 | 4 | 4 | 4 | 10 | 5 | 9 | 6 | 9 | 7 | 6 | 4 | 8 |
| Queenstown .. | 6 | 8 | 8 | 7 | 10 | 5 | 13 | 8 | 16 | 4 | 20 | 0 | 9 | 2 |
| Weighted Average | 7 | 2 | 9 | 5 | 12 | 0 | 14 | 9 | 18 | 4 | 23 | 7 | 12 | 4 |

* First 9 months only. † The rents are shewn to the nearest penny.

# APPENDIX VI.

## Average Annual Wolesale Prices in Melbourne, 1871 to 1912.

| COMMODITY. | UNIT | 1871. | 1872. | 1873. | 1874. | 1875. | 1876. |
|---|---|---|---|---|---|---|---|
| | | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. |
| GROUP I. METALS— | | | | | | | |
| Iron—Pig Mixed Nos. .. | ton | 99 1½ | 155 0 | 176 11 | 163 8 | 124 2 | 95 0 |
| Rod and Bar .. | ,, | 207 0 | 289 7½ | 331 2 | 320 9 | 263 2½ | 223 1 |
| Angle and Tee .. | ,, | 227 0 | 295 7 | 360 0 | 336 11 | 279 3½ | 236 2 |
| Plate .. .. .. | ,, | 241 6 | 373 10 | 401 6½ | 356 11 | 279 8 | 249 3 |
| Hoop .. .. | ,, | 230 6 | 331 6½ | 334 7½ | 334 3 | 301 5 | 257 4 |
| Galvanised Corrugated | ,, | 562 0 | 729 7 | 724 7 | 691 9 | 657 10 | 584 9½ |
| Wire, Fencing .. | ,, | 345 0 | 448 10 | 490 4½ | 516 11 | 420 9 | 358 1 |
| Zinc—Sheet .. .. | ,, | 527 0 | 651 11 | 750 0 | 748 10 | 677 6 | 614 3 |
| Lead—Sheet .. .. | ,, | 526 3 | 489 3 | 580 9 | 659 3 | 610 8½ | 564 7 |
| Piping .. .. | ,, | 520 0 | 520 0 | 586 2 | 584 7½ | 560 0 | 560 0 |
| Copper—Sheet .. .. | lb. | 1 0 | 1 1¼ | 1 0¾ | 1 1¼ | 1 2 | 1 2 |
| Coal (on Wharf) .. .. | ton | *20 9 | *28 5 | 39 8¾ | 33 7¼ | 31 0½ | 30 6½ |
| GROUP II. TEXTILES, LEATHER, &c | | | | | | | |
| Jute Goods—Branbags .. | dozen | 7 9⅞ | 8 7¾ | 8 3¾ | 7 3⅛ | 5 6⅜ | 5 5⅛ |
| Cornsacks .. | ,, | 11 7⅛ | 13 2½ | 13 2¾ | 11 2⅞ | 9 5⅞ | 7 8¾ |
| Woolpacks .. | each | 3 9⅜ | 4 8⅛ | 4 2¼ | 3 6¾ | 3 0¾ | 2 6¾ |
| Leather—Kip .. .. | lb. | 1 11½ | 2 2⅛ | 2 2⅞ | 2 0½ | 2 1 | 1 9¼ |
| Calf .. .. | ,, | 3 6⅜ | 3 10 | 3 7⅞ | 3 3 | 3 3 | 3 0 |
| Basils .. .. | dozen | 14 5 | 15 8 | 15 0 | 13 0 | 13 4⅜ | 13 0 |
| Cotton—Raw .. .. | lb. | 0 7⅝ | 0 9⅛ | 0 8⅝ | 0 7¾ | 0 7½ | 0 6½ |
| Silk—Raw .. .. .. | ,, | 21 7½ | 21 5¼ | 20 11¾ | 16 9½ | 15 4¼ | 19 2¼ |
| Wool .. .. .. | ,, | 1 2¼ | 1 3 | 1 3¼ | 1 2⅞ | 1 4⅛ | 1 3⅛ |
| GROUP III. AGRICULT'L PRODUCE | | | | | | | |
| Wheat .. .. .. | bushel | 6 4⅜ | 6 3 | 5 11¼ | 6 2½ | 5 10½ | 5 9⅝ |
| Flour .. .. .. | ton | 298 6 | 296 0 | 273 0 | 271 2 | 230 9 | 254 6 |
| Bran .. .. .. .. | bushel | 1 1⅛ | 1 1½ | 1 3⅛ | 1 6 | 1 5½ | 1 4 |
| Pollard .. .. .. | ,, | 1 2 | 1 3½ | 1 2¾ | 1 7¼ | 1 5⅜ | 1 4 |
| Oats .. .. .. .. | ,, | 3 5⅝ | 3 1 | 4 3½ | 5 5⅛ | 3 11⅝ | 3 0⅜ |
| Oatmeal .. .. .. | ton | 420 0 | 407 4 | 526 2 | 640 0 | 544 3 | 409 3 |
| Barley—Malting .. .. | bushel | 4 3 | 5 8½ | 6 3¼ | 5 11½ | 5 6¾ | 4 9⅛ |
| Feed .. .. | ,, | 3 2 | 3 10 | 4 4⅛ | 4 9 | 3 10¾ | 3 1⅜ |
| Maize .. .. .. | ,, | 4 0 | 3 4⅜ | 3 10½ | 5 3¼ | 5 2⅞ | 4 1⅝ |
| Hay .. .. .. .. | ton | 103 4 | 105 5 | 133 4 | 120 0 | 118 9 | 143 9 |
| Straw .. .. .. | ,, | 55 0 | 53 9 | 75 5 | 75 5 | 75 3 | 75 0 |
| Peas .. .. .. .. | bushel | 4 2¼ | 3 4¾ | 4 2⅜ | 5 6⅛ | 4 7 | 3 7⅞ |
| Potatoes .. .. .. | ton | 49 9 | 70 2½ | 60 1½ | 95 7½ | 98 1½ | 95 5 |
| GROUP IV. DAIRY PRODUCE— | | | | | | | |
| Ham .. .. .. .. | lb. | 0 10¼ | 0 10 | 0 10½ | 0 9½ | 0 11 | 1 0 |
| Bacon .. .. .. | ,, | 0 8⅛ | 0 8⅛ | 0 8⅜ | 0 8 | 0 9½ | 0 9½ |
| Cheese .. .. .. | ,, | 0 6⅜ | 0 7⅞ | 0 8⅜ | 0 9½ | 0 9⅞ | 0 9½ |
| Butter .. .. .. | ,, | 0 8¼ | 0 10⅞ | 0 10⅞ | 1 1 | 1 3⅝ | 1 4¾ |
| Lard .. .. .. .. | ,, | 0 4¾ | 0 6¼ | 0 6⅞ | 0 7¾ | 0 8 | 0 8 |
| Eggs .. .. .. .. | dozen | 1 2⅜ | 1 2⅝ | 1 2⅞ | 1 3¾ | 1 4⅛ | 1 4½ |
| Honey .. .. .. | lb. | 0 4 | 0 4 | 0 3⅞ | 0 3⅞ | 0 4¼ | 0 4¾ |
| GROUP V. GROCERIES, &c.— | | | | | | | |
| Currants .. .. .. | lb. | 0 5½ | 0 4⅞ | 0 4⅞ | 0 4¾ | 0 5⅛ | 0 5⅝ |
| Raisins .. .. .. | ,, | 0 7¼ | 0 7⅞ | 0 7⅝ | 0 7⅜ | 0 8⅝ | 0 8⅛ |
| Herrings .. .. .. | doz. 1 lb. tins | 9 0⅛ | 8 1⅛ | 9 1⅜ | 8 1¾ | 7 11¾ | 7 8½ |
| Salmon .. .. .. | ,, | 11 11½ | 12 7¾ | 15 3⅜ | 12 8½ | 9 6 | 10 8½ |
| Sardines .. .. .. | doz. hlvs | 12 5 | 13 4⅝ | 11 5½ | 9 8 | 8 11⅝ | 8 2½ |
| Tea .. .. .. .. | lb. | 1 7½ | 1 7¾ | 1 7¾ | 1 8 | 1 7¾ | 1 7½ |
| Coffee .. .. .. | ,, | 0 11⅜ | 1 0¾ | 1 2⅞ | 1 5⅞ | 1 4⅛ | 1 5 |
| Cocoa .. .. .. | ,, | 1 2⅞ | 1 3½ | 1 3½ | 1 4¼ | 1 3⅛ | 1 3¼ |
| Sugar .. .. .. | ton | 852 0 | 882 4 | 843 1 | 763 1 | 732 6 | 743 1 |
| Macaroni .. .. .. | lb. | 0 9½ | 0 10 | 0 10⅛ | 0 10 | 0 9⅝ | 0 9¾ |
| Sago .. .. .. | ,, | 0 2⅜ | 0 2⅝ | 0 3⅛ | 0 2¾ | 0 2½ | 0 2½ |
| Rice .. .. .. .. | ton | 431 0 | 402 4 | 466 4 | 489 3 | 446 5 | 382 6 |
| Salt—Fine .. .. .. | ,, | 84 8 | 90 7 | 92 9 | 97 11 | 81 6 | 71 0 |
| Rock .. .. .. | ,, | 74 9 | 116 0 | 94 3 | 92 4 | 109 8 | 70 5 |
| Mustard .. .. .. | doz. 1 lb. tins | 19 1 | 18 4⅝ | 18 1⅝ | 18 3¾ | 18 1½ | 17 8¾ |
| Starch .. .. .. | lb. | 0 5⅜ | 0 5¾ | 0 5⅞ | 0 6⅜ | 0 6⅝ | 0 5⅞ |
| Blue .. .. .. .. | ,, | 0 9¾ | 0 10¼ | 0 11 | 0 11 | 0 11 | 0 11 |
| Matches .. .. .. | gross | 5 0 | 4 3 | 4 1¾ | 4 1½ | 4 0⅛ | 4 0 |
| Candles .. .. .. | lb. | 0 10½ | 0 11¼ | 0 11⅞ | 0 10⅝ | 0 10¼ | 0 10⅛ |
| Kerosene .. .. .. | gallon | 2 6 | 2 4⅛ | 2 3⅝ | 1 11½ | 1 9⅜ | 2 3 |
| Tobacco .. .. .. | lb. | 3 3¼ | 3 3½ | 3 3⅞ | 3 4 | 3 7⅜ | 3 7⅝ |
| GROUP VI. MEAT— | | | | | | | |
| Beef .. .. .. .. | 100 lb. | .. | .. | .. | .. | .. | .. |
| Mutton .. .. .. | lb. | .. | .. | .. | .. | .. | .. |
| Lamb .. .. .. | each | .. | .. | .. | .. | .. | .. |
| Veal .. .. .. .. | lb. | .. | .. | .. | .. | .. | .. |
| Pork .. .. .. .. | ,, | .. | .. | .. | .. | .. | .. |
| GROUP VII. BUILDING MATERIAL | | | | | | | |
| Timber—Flooring—6 x 1½ | 100ft. lin | 9 7¼ | 10 3¼ | 15 1⅝ | 13 9⅝ | 12 1 | 12 8½ |
| 6 x ⅞ | ,, | 8 4¾ | 9 4 | 11 5¼ | 12 1¼ | 10 11 | 10 3¼ |
| 6 x ¾ | ,, | 7 4¼ | 6 11¾ | 9 3 | 10 11¼ | 8 4 | 8 6¾ |
| 6 x ½ | ,, | 5 4 | 6 5⅞ | 6 9⅛ | 8 0⅜ | 6 10¼ | 7 7¼ |
| Weatherboards .. | ,, | 5 8 | 6 9⅛ | 6 8⅜ | 6 11⅝ | 6 9¾ | 8 0½ |
| Oregon .. .. | 1000ft. sp | 184 0 | 172 8 | 296 10 | 193 8 | 152 7 | 155 8 |
| Shelving .. .. | ,, | 236 4 | 274 9½ | 289 3 | 210 10½ | 219 3 | 227 2½ |
| Cement .. .. .. | cask | 16 5 | 16 11 | 21 6 | 21 10 | 17 3⅛ | 16 2 |
| White Lead .. .. | ton | 800 0 | 800 0 | 848 6 | 852 4 | 817 2 | 840 0 |
| GROUP VIII. CHEMICALS— | | | | | | | |
| Cream of Tartar .. .. | lb. | 1 1½ | 1 2¼ | 1 3⅛ | 1 3 | 1 3⅛ | 1 3½ |
| Carbonate of Soda .. | ton | 309 6 | 376 11 | 476 6 | 495 5 | 392 2 | 333 10 |
| Saltpetre .. .. .. | ,, | 754 0 | 872 4 | 817 3 | 730 9 | 694 3 | 606 2 |
| Sulphur .. .. .. | ,, | 328 0 | 333 1 | 282 4 | 302 4 | 265 4 | 295 0 |

* In Bay.

Average Annual Wholesale Prices in Melbourne, 1871 to 1912—contd.

| COMMODITY. | UNIT. | 1877. | | 1878. | | 1879. | | 1880. | | 1881. | | 1882. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GROUP I. METALS— | | s. | d. | s. | d | s. | d. | s. | d. | s. | d. | s. | d. |
| Iron—Pig Mixed Nos. .. | ton | 102 | 1½ | 87 | 0½ | 84 | 3½ | 102 | 3½ | 91 | 5 | 87 | 4 |
| Rod and Bar .. | ,, | 197 | 4 | 190 | 11½ | 181 | 11 | 211 | 6½ | 186 | 11 | 193 | 8 |
| Angle and Tee .. | ,, | 204 | 7½ | 198 | 5½ | 198 | 5½ | 231 | 6½ | 197 | 6 | 201 | 1 |
| Plate .. .. .. | ,, | 242 | 1½ | 221 | 6½ | 206 | 6½ | 246 | 2 | 210 | 6 | 205 | 0 |
| Hoop .. .. | ,, | 225 | 0 | 205 | 9 | 194 | 7½ | 240 | 9 | 212 | 1½ | 202 | 4 |
| Galvanised Corrugated | ,, | 539 | 0½ | 468 | 10 | 451 | 6½ | 484 | 0 | 435 | 4 | 438 | 10 |
| Wire, Fencing .. | ,, | 307 | 7 | 285 | 0 | 266 | 2 | 283 | 1 | 283 | 2 | 276 | 2 |
| Zinc—Sheet .. .. | ,, | 613 | 10 | 550 | 0 | 507 | 8 | 540 | 0 | 530 | 9 | 487 | 8 |
| Lead—Sheet .. .. | ,, | 560 | 0 | 523 | 1 | 477 | 4 | 476 | 11 | 466 | 2 | 460 | 0 |
| Piping .. .. | ,, | 560 | 0 | 560 | 0 | 560 | 0 | 560 | 0 | 544 | 7 | 449 | 3 |
| Copper—Sheet .. .. | lb. | 1 | 2 | 1 | 1¾ | 1 | 0⅛ | 1 | 0 | 0 | 11⅞ | 0 | 11¼ |
| Coal (on Wharf) .. .. | ton | 31 | 6½ | 30 | 5 | 29 | 3 | 30 | 10½ | 25 | 11½ | 30 | 7½ |
| GROUP II TEXTILES, LEATHER, &c | | | | | | | | | | | | | |
| Jute Goods—Branbags .. | dozen | 6 | 5¾ | 6 | 4¼ | 6 | 1⅛ | 6 | 6 | 6 | 10⅜ | 6 | 1⅞ |
| Cornsacks .. | ,, | 9 | 5⅛ | 9 | 0¾ | 7 | 10½ | 8 | 9¼ | 9 | 8⅝ | 8 | 8⅜ |
| Woolpacks .. | each | 3 | 1⅜ | 3 | 2¼ | 2 | 6⅞ | 3 | 4½ | 3 | 3¼ | 3 | 3⅞ |
| Leather—Kip .. .. | lb. | 1 | 10½ | 1 | 8⅞ | 1 | 6 | 1 | 6⅝ | 1 | 8⅜ | 1 | 5½ |
| Calf .. .. | ,, | 2 | 9¼ | 2 | 7¾ | 2 | 4⅞ | 2 | 3⅝ | 2 | 9⅞ | 2 | 5 |
| Basils .. .. | dozen | 9 | 6 | 9 | 0½ | 11 | 9¾ | 11 | 0¼ | 13 | 10⅞ | 14 | 0 |
| Cotton—Raw .. .. | lb. | 0 | 6¼ | 0 | 6 | 0 | 5⅞ | 0 | 6⅜ | 0 | 6¼ | 0 | 6¼ |
| Silk—Raw .. .. .. | ,, | 20 | 0½ | 17 | 7¾ | 17 | 5 | 17 | 0½ | 16 | 11¾ | 16 | 6½ |
| Wool .. .. .. | ,, | 1 | 3 | 1 | 2½ | 1 | 2½ | 1 | 2¾ | 1 | 2½ | 1 | 0⅝ |
| GROUP III. AGRICULT'L PRODUCE | | | | | | | | | | | | | |
| Wheat .. .. .. | bushel | 6 | 6¼ | 5 | 4 | 5 | 5¼ | 4 | 4½ | 4 | 11 | 6 | 1⅝ |
| Flour .. .. .. | ton | 287 | 4 | 227 | 1 | 226 | 1 | 188 | 9 | 208 | 6 | 255 | 7 |
| Bran .. .. .. .. | bushel | 1 | 3⅞ | 1 | 2⅛ | 1 | 2⅞ | 0 | 10¾ | 1 | 0¼ | 1 | 6½ |
| Pollard .. .. .. | ,, | 1 | 4⅛ | 1 | 4⅝ | 1 | 3¼ | 0 | 11 | 1 | 1⅛ | 1 | 6½ |
| Oats .. .. .. .. | ,, | 3 | 8⅞ | 4 | 9 | 3 | 3⅛ | 2 | 2⅝ | 3 | 0⅛ | 3 | 10⅝ |
| Oatmeal .. .. .. | ton | 443 | 1 | 575 | 5 | 466 | 2 | 344 | 7 | 333 | 10 | 387 | 8 |
| Barley—Malting .. .. | bushel | 4 | 8¾ | 6 | 3½ | 6 | 7½ | 4 | 1⅝ | 3 | 3⅞ | 4 | 8½ |
| Feed .. .. | ,, | 3 | 6 | 4 | 1⅞ | 3 | 6½ | 2 | 4 | 2 | 9⅝ | 4 | 2¾ |
| Maize .. .. .. | ,, | 4 | 3⅛ | 5 | 1⅝ | 3 | 7⅛ | 3 | 0½ | 4 | 2½ | 6 | 1 |
| Hay .. .. .. .. | ton | 115 | 0 | 102 | 6 | 119 | 2 | 87 | 11 | 83 | 4 | 128 | 9 |
| Straw .. .. .. | ,, | 67 | 3 | 63 | 1 | 69 | 4 | 50 | 5 | 45 | 7 | 62 | 3 |
| Peas .. .. .. .. | bushel | 3 | 11⅞ | 5 | 3 | 3 | 10⅜ | 2 | 4⅞ | 3 | 6¼ | 4 | 8⅛ |
| Potatoes .. .. .. | ton | 82 | 11 | 95 | 7½ | 107 | 3½ | 45 | 10 | 59 | 4½ | 92 | 1 |
| GROUP IV. DAIRY PRODUCE— | | | | | | | | | | | | | |
| Ham .. .. .. .. | lb. | 0 | 11¾ | 0 | 11⅛ | 0 | 9½ | 0 | 9 | 0 | 8 | 0 | 7¾ |
| Bacon .. .. .. | ,, | 0 | 8¾ | 0 | 8⅜ | 0 | 6⅝ | 0 | 6⅜ | 0 | 6⅛ | 0 | 6⅞ |
| Cheese .. .. .. | ,, | 0 | 8⅝ | 0 | 7⅞ | 0 | 6½ | 0 | 5⅞ | 0 | 5 | 0 | 8⅞ |
| Butter .. .. .. | ,, | 1 | 3 | 0 | 11¾ | 1 | 1¾ | 0 | 9¾ | 0 | 10¾ | 1 | 5 |
| Lard .. .. .. .. | ,, | 0 | 7⅛ | 0 | 8¼ | 0 | 6 | 0 | 5⅝ | 0 | 5 | 0 | 7½ |
| Eggs .. .. .. .. | dozen | 1 | 5¼ | 1 | 5¼ | 1 | 3½ | 1 | 1¾ | 1 | 1½ | 1 | 3⅞ |
| Honey .. .. .. | lb. | 0 | 4⅞ | 0 | 5 | 0 | 4½ | 0 | 4⅞ | 0 | 4⅝ | 0 | 4¾ |
| GROUP V. GROCERIES, &c.— | | | | | | | | | | | | | |
| Currants .. .. .. | lb. | 0 | 5¼ | 0 | 4½ | 0 | 4½ | 0 | 5⅝ | 0 | 5½ | 0 | 5 |
| Raisins .. .. .. | ,, | 0 | 6⅜ | 0 | 5½ | 0 | 6¼ | 0 | 6¾ | 0 | 8¼ | 0 | 7 |
| Herrings .. .. .. | doz. 1 lb. tins | 7 | 4¼ | 7 | 0⅛ | 6 | 10½ | 7 | 3 | 6 | 10½ | 7 | 1⅞ |
| Salmon .. .. .. | ,, | 12 | 10⅝ | 9 | 1½ | 8 | 3¼ | 9 | 2⅝ | 8 | 9¼ | 9 | 4¾ |
| Sardines .. .. .. | doz. hlvs | 11 | 5⅝ | 8 | 7¼ | 7 | 7¼ | 7 | 8¾ | 9 | 7 | 10 | 1⅛ |
| Tea .. .. .. .. | lb. | 1 | 7 | 1 | 6⅜ | 1 | 5¾ | 1 | 4½ | 1 | 3⅞ | 1 | 3⅝ |
| Coffee .. .. .. | ,, | 1 | 4¾ | 1 | 4⅝ | 1 | 3⅞ | 1 | 3¾ | 1 | 1¼ | 1 | 0⅝ |
| Cocoa .. .. .. | ,, | 1 | 3¼ | 1 | 3¼ | 1 | 3¾ | 1 | 3½ | 1 | 3⅝ | 1 | 3 |
| Sugar .. .. .. | ton | 780 | 9 | 737 | 4 | 763 | 10 | 806 | 2 | 760 | 0 | 760 | 0 |
| Macaroni .. .. .. | lb. | 0 | 10½ | 0 | 10½ | 0 | 10½ | 0 | 11 | 0 | 10 | 0 | 10 |
| Sago .. .. .. .. | ,, | 0 | 2½ | 0 | 2¾ | 0 | 2¾ | 0 | 2⅝ | 0 | 2⅜ | 0 | 2⅜ |
| Rice .. .. .. .. | ton | 406 | 10 | 494 | 2 | 418 | 0 | 479 | 6 | 436 | 0 | 455 | 3 |
| Salt—Fine .. .. .. | ,, | 90 | 1 | 80 | 8 | 82 | 1 | 91 | 8 | 84 | 6 | 81 | 5 |
| Rock .. .. .. | ,, | 74 | 10 | 52 | 11 | 50 | 6 | 82 | 4 | 66 | 10 | 48 | 3 |
| Mustard .. .. .. | doz. 1 lb. tins | 17 | 5 | 17 | 5 | 17 | 11⅞ | 18 | 1 | 18 | 1⅞ | 18 | 6 |
| Starch .. .. .. | lb. | 0 | 5⅝ | 0 | 6⅛ | 0 | 6⅛ | 0 | 6¼ | 0 | 5⅞ | 0 | 5½ |
| Blue .. .. .. .. | ,, | 0 | 11 | 0 | 11 | 0 | 10⅞ | 0 | 9⅝ | 0 | 9¾ | 0 | 9¾ |
| Matches .. .. .. | gross | 3 | 7⅛ | 3 | 4¾ | 3 | 0¾ | 2 | 8¾ | 2 | 11¼ | 2 | 4⅞ |
| Candles .. .. .. | lb. | 0 | 10½ | 0 | 9¾ | 0 | 9⅛ | 0 | 8⅝ | 0 | 8½ | 0 | 8¼ |
| Kerosene .. .. .. | gallon | 2 | 2⅞ | 1 | 7⅝ | 1 | 5½ | 1 | 6½ | 1 | 6¾ | 1 | 5⅞ |
| Tobacco .. .. .. | lb. | 3 | 7 | 3 | 4⅛ | 3 | 3⅝ | 3 | 3½ | 4 | 3⅜ | 4 | 5¼ |
| GROUP VI. MEAT— | | | | | | | | | | | | | |
| Beef .. .. .. .. | 100 lb. | | | | | | | | | | | | |
| Mutton .. .. .. | lb. | .. | | .. | | .. | | .. | | .. | | .. | |
| Lamb .. .. .. | each | .. | | .. | | .. | | .. | | .. | | .. | |
| Veal .. .. .. .. | lb. | .. | | .. | | .. | | .. | | .. | | .. | |
| Pork .. .. .. .. | ,, | .. | | .. | | .. | | .. | | .. | | .. | |
| GROUP VII. BUILDING MATERIAL | | .. | | .. | | .. | | .. | | .. | | .. | |
| Timber—Flooring—6 x 1⅛ | 100ft. lin | 13 | 0½ | 10 | 6¼ | 9 | 11¼ | 11 | 6¼ | 11 | 7¼ | 11 | 7½ |
| 6 x ⅞ | ,, | 10 | 9½ | 9 | 6½ | 8 | 0¾ | 9 | 6½ | 9 | 11 | 10 | 0¾ |
| 6 x ¾ | ,, | 9 | 9 | 8 | 0½ | 7 | 2 | 7 | 11¼ | 8 | 4 | 7 | 11¾ |
| 6 x ½ | ,, | 7 | 5 | 6 | 9½ | 5 | 9¾ | 6 | 1¾ | 6 | 4 | 6 | 7 |
| Weatherboards .. | ,, | 6 | 11 | 6 | 10¾ | 6 | 3½ | 6 | 10¾ | 7 | 3¼ | 7 | 3¾ |
| Oregon .. .. | 1000ft sp | 164 | 4 | 125 | 10½ | 123 | 4 | 146 | 10 | 183 | 11 | 149 | 11 |
| Shelving .. .. | ,, | 217 | 9½ | 178 | 6 | 174 | 11 | 187 | 7 | 233 | 0 | 235 | 0 |
| Cement .. .. .. | cask | 16 | 6 | 15 | 9¾ | 17 | 6¾ | 16 | 5¾ | 16 | 8⅝ | 14 | 7¾ |
| White Lead .. .. | ton | 855 | 6 | 789 | 3 | 762 | 0 | 750 | 9 | 735 | 5 | 672 | 4 |
| GROUP VIII. CHEMICALS— | | | | | | | | | | | | | |
| Cream of Tartar .. .. | lb. | 1 | 4 | 1 | 2¾ | 1 | 3 | 1 | 4¼ | 1 | 4⅞ | 1 | 3¾ |
| Carbonate of Soda .. | ton | 303 | 1 | 263 | 6 | 280 | 5 | 342 | 8 | 290 | 0 | 262 | 1 |
| Saltpetre .. .. .. | ,, | 643 | 10 | 641 | 6 | 658 | 1 | 675 | 5 | 668 | 6 | 690 | 9 |
| Sulphur .. .. .. | ,, | 358 | 6 | 279 | 7 | 278 | 6 | 360 | 0 | 309 | 3 | 308 | 1 |

## Average Annual Wholesale Prices in Melbourne, 1871 to 1912—contd.

| COMMODITY. | UNIT. | 1883. | 1884. | 1885. | 1886. | 1887. | 1888. |
|---|---|---|---|---|---|---|---|
| GROUP I. METALS— | | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. |
| Iron—Pig Mixed Nos. .. | ton | 84 3 | 78 10 | 75 10½ | 72 4 | 74 9 | 86 4 |
| Rod and Bar .. | ,, | 182 6 | 180 0 | 165 10 | 151 6½ | 139 8½ | 148 5½ |
| Angle and Tee .. | ,, | 197 6 | 199 0 | 182 8 | 164 7½ | 160 0 | 153 1 |
| Plate .. .. .. | ,, | 209 3 | 210 0 | 202 3 | 180 0 | 180 0 | 180 0 |
| Hoop .. .. | ,, | 200 9 | 200 0 | 190 0 | 180 0 | 176 2 | 171 2 |
| Galvanised Corrugated | ,, | 438 6 | 399 5 | 363 3 | 333 8 | 333 3 | 363 6 |
| Wire, Fencing .. | ,, | 254 7 | 254 5 | 211 6½ | 185 4½ | 173 10 | 188 3 |
| Zinc—Sheet .. .. | ,, | 469 2½ | 466 9½ | 446 11 | 433 10 | 415 0 | 427 4 |
| Lead—Sheet .. .. | ,, | 444 3 | 372 10 | 359 7½ | 396 9 | 404 7½ | 416 11 |
| Piping .. .. | ,, | 426 6 | 410 0 | 410 0 | 410 0 | 371 6½ | 410 0 |
| Copper—Sheet .. .. | lb. | 0 10⅞ | 0 10½ | 0 10 | 0 9 | 0 8⅛ | 0 11⅞ |
| Coal (on Wharf) .. .. | ton | 28 9 | 28 6½ | 30 0 | 29 3 | 25 9 | 29 11½ |
| GROUP II. TEXTILES, LEATHER, &c | | | | | | | |
| Jute Goods—Branbags .. | dozen | 4 10⅝ | 5 1⅜ | 4 1⅜ | 3 10⅜ | 3 11¼ | 4 7¾ |
| Cornsacks .. | ,, | 7 7⅛ | 6 11⅝ | 5 8¾ | 4 11¼ | 5 10⅝ | 6 3½ |
| Woolpacks .. | each | 2 9⅜ | 2 7 | 2 3¼ | 2 5¼ | 2 8 | 2 2½ |
| Leather—Kip .. .. | lb. | 1 6 | 1 6 | 1 6 | 1 6 | 1 6 | 1 6 |
| Calf .. .. | ,, | 2 8 | 2 7½ | 2 7½ | 2 6⅞ | 2 6 | 2 6 |
| Basils .. .. | dozen | 14 0 | 14 0 | 14 0 | 14 0 | 14 0⅞ | 14 0 |
| Cotton—Raw .. .. | lb. | 0 6¼ | 0 6⅛ | 0 6⅛ | 0 5⅜ | 0 5⅜ | 0 5½ |
| Silk—Raw .. .. .. | ,, | 16 2½ | 14 9½ | 14 1 | 13 8¾ | 13 7¾ | 12 3½ |
| Wool .. .. .. .. | ,, | 1 0⅝ | 1 0½ | 0 10½ | 0 9⅜ | 0 10¾ | 0 10⅜ |
| GROUP III. AGRICULT'L PRODUCE | | | | | | | |
| Wheat .. .. .. | bushel | 4 11 | 4 2⅞ | 3 10⅞ | 4 9¾ | 3 9½ | 3 9½ |
| Flour .. .. .. | ton | 204 9 | 177 11 | 159 4 | 203 7 | 169 4 | 176 8 |
| Bran .. .. .. .. | bushel | 1 1 | 1 0 | 1 0⅝ | 1 1⅜ | 0 9⅜ | 0 10¼ |
| Pollard .. .. .. | ,, | 1 1½ | 1 0½ | 1 0¼ | 1 1⅛ | 0 9 | 0 9¼ |
| Oats .. .. .. .. | ,, | 3 1⅜ | 3 0⅝ | 2 10⅛ | 2 10 | 2 7⅜ | 2 10⅞ |
| Oatmeal .. .. .. | ton | 357 9 | 344 8 | 363 10 | 385 9 | 376 6 | 383 6 |
| Barley—Malting .. .. | bushel | 5 6 | 4 2⅛ | 4 4⅜ | 3 11⅛ | 5 3⅛ | 5 5 |
| Feed .. .. | ,, | 3 10 | 2 11¾ | 2 11¾ | 2 11 | 3 7 | 3 2¾ |
| Maize .. .. .. | ,, | 4 4 | 5 0½ | 4 2¾ | 4 3½ | 4 0⅝ | 3 7⅝ |
| Hay .. .. .. .. | ton | 120 10 | 104 2 | 119 2 | 119 7 | 126 3 | 112 11 |
| Straw .. .. .. | ,, | 57 6 | 53 9 | 58 4 | 59 2 | 61 8 | 55 0 |
| Peas .. .. .. .. | bushel | 3 7⅛ | 3 4¼ | 3 3¼ | 3 5 | 3 4½ | 2 11¾ |
| Potatoes .. .. .. | ton | 63 4 | 75 5 | 62 7 | 71 5½ | 61 5½ | 70 0 |
| GROUP IV. DAIRY PRODUCE— | | | | | | | |
| Ham .. .. .. .. | lb. | 0 9¼ | 0 9⅜ | 0 9⅝ | 0 9¼ | 0 9½ | 0 9⅞ |
| Bacon .. .. .. | ,, | 0 8⅜ | 0 8⅜ | 0 8⅝ | 0 8¼ | 0 8¼ | 0 8⅞ |
| Cheese .. .. .. | ,, | 0 7½ | 0 6⅜ | 0 7⅜ | 0 7½ | 0 6½ | 0 5⅜ |
| Butter .. .. .. | ,, | 1 0½ | 1 1⅜ | 1 4⅛ | 1 3⅞ | 1 0⅜ | 1 2⅝ |
| Lard .. .. .. .. | ,, | 0 8⅛ | 0 7 | 0 7 | 0 6⅛ | 0 6¼ | 0 5⅛ |
| Eggs .. .. .. .. | dozen | 1 2⅞ | 1 2⅞ | 1 3⅜ | 1 2⅝ | 1 2½ | 1 2 |
| Honey .. .. .. | lb. | 0 5¼ | 0 5¼ | 0 4 | 0 3¾ | 0 4⅛ | 0 4⅛ |
| GROUP V. GROCERIES, &c.— | | | | | | | |
| Currants .. .. .. | lb. | 0 5⅛ | 0 5 | 0 4⅜ | 0 5 | 0 5⅜ | 0 4¾ |
| Raisins .. .. .. | ,, | 0 6¾ | 0 6½ | 0 5¼ | 0 5½ | 0 5⅝ | 0 5¾ |
| Herrings .. .. .. | doz. 1 lb. tins | 7 2⅜ | 6 4⅝ | 5 11⅜ | 5 9¾ | 5 9⅜ | 6 1¾ |
| Salmon .. .. .. | ,, | 8 11⅞ | 8 1⅛ | 7 4⅝ | 8 9⅛ | 9 3 | 9 10⅛ |
| Sardines .. .. .. | doz. hlvs | 9 8⅛ | 8 2¾ | 7 10⅜ | 7 10⅜ | 7 9 | 7 1¼ |
| Tea .. .. .. .. | lb. | 1 3½ | 1 2¾ | 1 3⅛ | 1 2¾ | 1 1⅝ | 1 2 |
| Coffee .. .. .. | ,, | 1 1 | 1 0⅝ | 1 0 | 0 11⅛ | 1 3 | 1 3 |
| Cocoa .. .. .. | ,, | 1 3⅛ | 1 3 | 1 2⅞ | 1 2½ | 1 2⅜ | 1 2⅜ |
| Sugar .. .. .. | ton | 755 0 | 683 7 | 518 6 | 494 3 | 485 9 | 470 9 |
| Macaroni .. .. .. | lb. | 0 10⅛ | 0 8⅞ | 0 7⅜ | 0 7¾ | 0 7⅜ | 0 7½ |
| Sago .. .. .. .. | ,, | 0 2⅛ | 0 1⅞ | 0 1¼ | 0 1½ | 0 1½ | 0 2¼ |
| Rice .. .. .. .. | ton | 435 10 | 459 0 | 438 9 | 406 6 | 440 0 | 413 0 |
| Salt—Fine .. .. .. | ,, | 80 7 | 80 9 | 81 9 | 84 7 | 81 8 | 83 5 |
| Rock .. .. .. | ,, | 52 7 | 58 0 | 53 3 | 68 8 | 65 6 | 55 9 |
| Mustard .. .. .. | doz. 1 lb. tins | 18 3¾ | 18 3 | 18 3 | 18 3 | 18 0¼ | 17 9½ |
| Starch .. .. .. | lb. | 0 5⅝ | 0 5¼ | 0 5 | 0 4⅝ | 0 4⅝ | 0 4⅝ |
| Blue .. .. .. .. | ,, | 0 9½ | 0 9⅜ | 0 9¼ | 0 8⅜ | 0 8⅜ | 0 8¼ |
| Matches .. .. .. | gross | 1 11 | 2 2⅛ | 2 4¾ | 2 2¾ | 1 9½ | 1 9½ |
| Candles .. .. .. | lb. | 0 9¾ | 0 9½ | 0 8⅝ | 0 7¼ | 0 6¾ | 0 6⅝ |
| Kerosene .. .. .. | gallon | 1 5¾ | 1 5½ | 1 4¾ | 1 5½ | 1 6⅝ | 1 7⅞ |
| Tobacco .. .. .. | lb. | 4 5 | 4 5 | 4 4½ | 4 5 | 4 5 | 4 4¾ |
| GROUP VI. MEAT— | | | | | | | |
| Beef .. .. .. .. | 100 lb. | .. | 23 3¾ | 21 7½ | .. | .. | .. |
| Mutton .. .. .. | lb. | .. | 0 2⅛ | 0 1⅞ | .. | .. | .. |
| Lamb .. .. .. | each | .. | 7 2½ | 7 4½ | .. | .. | .. |
| Veal .. .. .. .. | lb. | .. | 0 2¾ | 0 3¼ | .. | .. | .. |
| Pork .. .. .. .. | ,, | .. | 0 7½ | 0 6¼ | .. | .. | .. |
| GROUP VII. BUILDING MATERIAL | | | | | | | |
| Timber—Flooring—6 x 1⅛ | 100ft. lin | 9 9½ | 8 5½ | 8 10¾ | 8 10⅛ | 8 7 | 9 0½ |
| 6 x ⅞ | ,, | 7 10¾ | 7 5⅜ | 8 1⅝ | 7 1½ | 6 8 | 8 1 |
| 6 x ¾ | ,, | 6 7¼ | 5 2¼ | 6 0⅜ | 5 10¼ | 5 5½ | 6 10½ |
| 6 x ½ | ,, | 5 0½ | 4 6 | 5 4⅛ | 4 6⅝ | 4 3¾ | 4 6⅞ |
| Weatherboards .. | ,, | 6 0¼ | 6 0⅝ | 5 6⅞ | 4 10½ | 4 10½ | 6 0¼ |
| Oregon .. .. | 1000ft sp | 136 0 | 129 10 | 137 8 | 98 1 | 111 3 | 138 1 |
| Shelving .. .. | ,, | 227 3 | 222 11⅜ | 218 6¾ | 193 3 | 223 2 | 250 3 |
| Cement .. .. .. | cask | 15 2½ | 15 0⅝ | 14 2 | 12 3¾ | 12 1 | 15 8⅝ |
| White Lead .. .. | ton | 634 7 | 608 6 | 550 0 | 530 9 | 535 0 | 598 6 |
| GROUP VIII. CHEMICALS— | | | | | | | |
| Cream of Tartar .. .. | lb. | 1 4⅜ | 1 4⅝ | 1 4¼ | 1 4 | 1 4⅜ | 1 4¼ |
| Carbonate of Soda .. | ton | 238 4 | 213 10 | 204 6 | 195 5 | 188 4 | 166 2 |
| Saltpetre .. .. .. | ,, | 660 0 | 651 5 | 630 0 | 576 10 | 564 7 | 547 8 |
| Sulphur .. .. .. | ,, | 260 0 | 260 0 | 244 7 | 236 2 | 218 6 | 234 7 |

## Average Annual Wholesale Prices in Melbourne, 1871 to 1912—contd.

| COMMODITY. | UNIT. | 1889. | | 1890. | | 1891. | | 1892. | | 1893. | | 1894. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. |
| **GROUP I. METALS—** | | | | | | | | | | | | | |
| Iron—Pig Mixed Nos. .. | ton | 83 | 7 | 90 | 0 | 78 | 3 | 76 | 3 | 70 | 5½ | 66 | 5 |
| Rod and Bar .. | ,, | 163 | 0 | 205 | 1 | 181 | 11 | 165 | 9 | 160 | 0 | 157 | 10½ |
| Angle and Tee .. | ,, | 147 | 7 | 161 | 9 | 190 | 4½ | 182 | 2½ | 182 | 6 | 182 | 6 |
| Plate .. .. .. | ,, | 180 | 0 | 180 | 0 | 180 | 0 | 180 | 0 | 180 | 0 | 180 | 0 |
| Hoop .. .. | ,, | 174 | 3 | 192 | 4 | 185 | 4½ | 190 | 4½ | 190 | 4½ | 175 | 0 |
| Galvanised Corrugated | ,, | 377 | 6 | 420 | 9 | 388 | 0 | 358 | 8 | 347 | 3 | 328 | 4 |
| Wire, Fencing .. | ,, | 195 | 0 | 232 | 0 | 209 | 9 | 178 | 0 | 161 | 4 | 156 | 4 |
| Zinc—Sheet .. .. | ,, | 458 | 1 | 567 | 8 | 612 | 4 | 612 | 8 | 550 | 0 | 545 | 0 |
| Lead—Sheet .. .. | ,, | 402 | 8 | 420 | 0 | 420 | 0 | 420 | 0 | 420 | 0 | 420 | 0 |
| Piping .. .. | ,, | 425 | 4½ | 460 | 0 | 460 | 0 | 460 | 0 | 460 | 0 | 460 | 0 |
| Copper—Sheet .. .. | lb. | 1 | 0½ | 0 | 10 | 0 | 9⅝ | 0 | 9 | 0 | 8¾ | 0 | 8¾ |
| Coal (on Wharf) .. .. | ton | 24 | 0 | 35 | 6 | 18 | 0 | 18 | 8 | 18 | 0 | 14 | 7 |
| **GROUP II TEXTILES, LEATHER, &C** | | | | | | | | | | | | | |
| Jute Goods—Branbags .. | dozen | 4 | 10½ | 4 | 7 | 4 | 3⅞ | 4 | 1½ | 3 | 9½ | 3 | 4⅞ |
| Cornsacks .. | ,, | 5 | 9⅞ | 6 | 0 | 5 | 3½ | 5 | 8⅛ | 5 | 0⅜ | 4 | 9⅞ |
| Woolpacks .. | each | 2 | 0¼ | 2 | 2⅜ | 1 | 10⅞ | 2 | 1¾ | 1 | 11½ | 1 | 9½ |
| Leather—Kip .. .. | lb. | 1 | 6 | 1 | 5¼ | 1 | 3¾ | 1 | 3⅛ | 1 | 1 | 1 | 0¼ |
| Calf .. .. | ,, | 2 | 6 | 2 | 5¾ | 2 | 4½ | 2 | 4¼ | 1 | 11¾ | 1 | 8 |
| Basils .. .. | dozen | 14 | 0 | 14 | 5⅝ | 16 | 10⅝ | 13 | 6 | 18 | 6 | 16 | 2 |
| Cotton—Raw .. .. | lb. | 0 | 5⅝ | 0 | 5¾ | 0 | 5½ | 0 | 5⅛ | 0 | 5¼ | 0 | 4½ |
| Silk—Raw .. .. .. | ,, | 14 | 0½ | 14 | 2½ | 13 | 6 | 13 | 1 | 12 | 10½ | 13 | 0¾ |
| Wool .. .. .. | ,, | 0 | 10⅜ | 0 | 11 | 0 | 9¾ | 0 | 9 | 0 | 8⅞ | 0 | 8⅝ |
| **GROUP III. AGRICULT'L PRODUCE** | | | | | | | | | | | | | |
| Wheat .. .. .. | bushel | 5 | 2¼ | 3 | 9⅛ | 4 | 8¼ | 4 | 0⅛ | 3 | 0⅜ | 2 | 3½ |
| Flour .. .. .. | ton | 230 | 6 | 168 | 11½ | 218 | 5½ | 194 | 9 | 150 | 8 | 119 | 0 |
| Bran .. .. .. .. | bushel | 1 | 1¼ | 0 | 9¾ | 0 | 10½ | 0 | 10½ | 0 | 8 | 0 | 6¼ |
| Pollard .. .. .. | ,, | 1 | 1¾ | 0 | 10¼ | 0 | 10⅜ | 0 | 11⅛ | 0 | 8⅜ | 0 | 7⅛ |
| Oats .. .. .. .. | ,, | 3 | 7½ | 2 | 7¾ | 2 | 5⅛ | 2 | 2 | 1 | 10 | 1 | 7⅞ |
| Oatmeal .. .. .. | ton | 451 | 2 | 416 | 6 | 394 | 7 | 313 | 10 | 283 | 10 | 263 | 1 |
| Barley—Malting .. .. | bushel | 5 | 6 | 3 | 10 | 3 | 1⅝ | 3 | 7⅝ | 4 | 7 | 4 | 10⅝ |
| Feed .. .. | ,, | 3 | 6¼ | 2 | 2½ | 2 | 0½ | 2 | 4⅜ | 2 | 2 | 2 | 1⅝ |
| Maize .. .. .. | ,, | 4 | 1⅞ | 3 | 10 | 3 | 4½ | 2 | 9½ | 3 | 2 | 2 | 3 |
| Hay .. .. .. .. | ton | 155 | 10 | 95 | 5 | 91 | 8 | 90 | 10 | 73 | 4 | 56 | 8 |
| Straw .. .. .. | ,, | 67 | 11 | 53 | 4 | 50 | 0 | 54 | 4 | 40 | 7 | 38 | 5 |
| Peas .. .. .. .. | bushel | 4 | 7 | 3 | 2⅛ | 2 | 6 | 2 | 8½ | 2 | 4⅜ | 1 | 11 |
| Potatoes .. .. .. | ton | 105 | 7½ | 80 | 2½ | 58 | 6½ | 53 | 4 | 87 | 10 | 47 | 8½ |
| **GROUP IV. DAIRY PRODUCE—** | | | | | | | | | | | | | |
| Ham .. .. .. .. | lb. | 0 | 10 | 0 | 9¾ | 0 | 9¼ | 0 | 8¾ | 0 | 7¾ | 0 | 6⅞ |
| Bacon .. .. .. | ,, | 0 | 8½ | 0 | 8⅛ | 0 | 7½ | 0 | 7⅜ | 0 | 6½ | 0 | 5½ |
| Cheese .. .. .. | ,, | 0 | 6 | 0 | 5⅜ | 0 | 5⅝ | 0 | 6⅜ | 0 | 5⅛ | 0 | 4⅝ |
| Butter .. .. .. | ,, | 0 | 11⅞ | 1 | 0⅞ | 0 | 11⅛ | 1 | 0¾ | 0 | 9½ | 0 | 7¾ |
| Lard .. .. .. .. | ,, | 0 | 5 | 0 | 4¾ | 0 | 4⅝ | 0 | 6 | 0 | 5½ | 0 | 4 |
| Eggs .. .. .. .. | dozen | 1 | 4⅜ | 1 | 1¾ | 1 | 2 | 1 | 0⅜ | 0 | 11 | 0 | 10⅛ |
| Honey .. .. .. | lb. | 0 | 3½ | 0 | 4½ | 0 | 3⅞ | 0 | 3 | 0 | 2¾ | 0 | 3⅛ |
| **GROUP V. GROCERIES, &C.—** | | | | | | | | | | | | | |
| Currants .. .. .. | lb. | 0 | 4⅜ | 0 | 4⅝ | 0 | 4¾ | 0 | 4⅝ | 0 | 5¼ | 0 | 4⅜ |
| Raisins .. .. .. | ,, | 0 | 5⅜ | 0 | 7⅜ | 0 | 7½ | 0 | 5⅝ | 0 | 5⅜ | 0 | 5½ |
| Herrings .. .. .. | doz. 1 lb. tins | 6 | 4⅛ | 5 | 10 | 5 | 5¼ | 5 | 6⅞ | 5 | 6⅜ | 5 | 6⅜ |
| Salmon .. .. .. | ,, | 9 | 2 | 7 | 5⅞ | 7 | 1⅛ | 7 | 2⅛ | 7 | 3¾ | 7 | 2¾ |
| Sardines .. .. .. | doz. hlvs | 6 | 9⅛ | 6 | 6⅝ | 6 | 3⅜ | 6 | 4⅝ | 6 | 11⅝ | 5 | 11⅛ |
| Tea .. .. .. .. | lb. | 1 | 1⅞ | 0 | 11⅝ | 0 | 11¾ | 0 | 11⅛ | 1 | 0¾ | 1 | 0⅝ |
| Coffee .. .. .. | ,, | 1 | 3½ | 1 | 5⅛ | 1 | 2⅛ | 1 | 2⅛ | 1 | 1⅞ | 1 | 1⅞ |
| Cocoa .. .. .. | ,, | 1 | 2⅜ | 1 | 2¼ | 1 | 2¼ | 1 | 2⅜ | 1 | 2⅜ | 1 | 2⅜ |
| Sugar .. .. .. | ton | 520 | 9 | 484 | 7 | 458 | 6 | 450 | 0 | 465 | 5 | 505 | 0 |
| Macaroni .. .. .. | lb. | 0 | 7 | 0 | 6¾ | 0 | 7 | 0 | 6⅝ | 0 | 6⅜ | 0 | 6⅜ |
| Sago .. .. .. | ,, | 0 | 2⅝ | 0 | 2¼ | 0 | 2⅛ | 0 | 1⅝ | 0 | 1½ | 0 | 1⅜ |
| Rice .. .. .. .. | ton | 416 | 2 | 468 | 4 | 447 | 0 | 442 | 8 | 402 | 2 | 393 | 4 |
| Salt—Fine .. .. .. | ,, | 90 | 0 | 98 | 10 | 87 | 11 | 84 | 3 | 82 | 6 | 81 | 9 |
| Rock .. .. .. | ,, | 54 | 3 | 57 | 4 | 54 | 8 | 49 | 0 | 47 | 6 | 47 | 6 |
| Mustard .. .. .. | doz. 1 lb. tins | 17 | 9 | 17 | 9 | 17 | 8⅝ | 17 | 8¼ | 17 | 8¼ | 17 | 8¼ |
| Starch .. .. .. | lb. | 0 | 4¾ | 0 | 4⅞ | 0 | 4¾ | 0 | 4¾ | 0 | 4¾ | 0 | 4¾ |
| Blue .. .. .. .. | ,, | 0 | 8⅛ | 0 | 8⅛ | 0 | 8⅛ | 0 | 8¼ | 0 | 8¼ | 0 | 8⅜ |
| Matches .. .. .. | gross | 1 | 9 | 1 | 5⅞ | 1 | 6 | 1 | 3⅝ | 1 | 4⅝ | 1 | 4⅜ |
| Candles .. .. .. | lb. | 0 | 6⅝ | 0 | 7⅛ | 0 | 7 | 0 | 6⅞ | 0 | 7¼ | 0 | 7¼ |
| Kerosene .. .. .. | gallon | 1 | 6⅜ | 0 | 11⅞ | 0 | 9¾ | 0 | 8⅛ | 0 | 8⅛ | 0 | 8½ |
| Tobacco .. .. .. | lb. | 4 | 4¾ | 4 | 4¼ | 4 | 4½ | 4 | 4⅝ | 4 | 5⅜ | 4 | 6 |
| **GROUP VI. MEAT—** | | | | | | | | | | | | | |
| Beef .. .. .. .. | 100 lb. | .. | | 18 | 6½ | 16 | 7½ | 17 | 3⅞ | 15 | 11¼ | 13 | 0¾ |
| Mutton .. .. .. | lb. | .. | | 0 | 2⅛ | 0 | 1⅞ | 0 | 1⅞ | 0 | 1¾ | 0 | 1½ |
| Lamb .. .. .. | each | .. | | 7 | 11¼ | 7 | 2⅛ | 6 | 6⅞ | 5 | 10⅜ | 5 | 6⅜ |
| Veal .. .. .. .. | lb. | .. | | 0 | 2⅞ | 0 | 2 | 0 | 2 | 0 | 1¾ | 0 | 1½ |
| Pork .. .. .. .. | ,, | .. | | 0 | 5¼ | 0 | 5 | 0 | 4¾ | 0 | 4⅛ | 0 | 3¼ |
| **GROUP VII. BUILDING MATERIAL** | | | | | | | | | | | | | |
| Timber—Flooring—6 x 1⅛ | 100ft. lin | 9 | 10⅞ | 8 | 8¾ | 7 | 3½ | 7 | 1¾ | 6 | 7 | 6 | 10¼ |
| 6 x ⅞ | ,, | 8 | 6½ | 7 | 2¼ | 6 | 0¾ | 5 | 9½ | 5 | 4⅛ | 5 | 8 |
| 6 x ¾ | ,, | 6 | 10⅜ | 5 | 11¾ | 5 | 4⅞ | 4 | 5⅛ | 4 | 2⅜ | 4 | 8¼ |
| 6 x ½ | ,, | 5 | 1⅞ | 4 | 8⅜ | 4 | 5¾ | 3 | 11¾ | 3 | 8⅞ | 4 | 0⅝ |
| Weatherboards .. | ,, | 5 | 6½ | 4 | 7¼ | 4 | 2⅜ | 4 | 6½ | 4 | 8½ | 4 | 5¾ |
| Oregon .. .. | 1000ft sp | 130 | 11½ | 136 | 3 | 113 | 9 | 92 | 4 | 100 | 0 | 104 | 4 |
| Shelving .. .. | ,, | 270 | 11 | 242 | 5 | 221 | 6½ | 199 | 3 | 218 | 6 | 205 | 5 |
| Cement .. .. .. | cask | 15 | 7 | 14 | 6 | 12 | 9 | 12 | 2 | 12 | 5½ | 11 | 9½ |
| White Lead .. .. | ton | 605 | 9 | 585 | 5 | 605 | 5 | 595 | 9 | 547 | 8 | 540 | 0 |
| **GROUP VIII. CHEMICALS—** | | | | | | | | | | | | | |
| Cream of Tartar .. .. | lb. | 1 | 2⅛ | 1 | 2 | 1 | 0¾ | 1 | 0⅛ | 0 | 10⅜ | 0 | 8¾ |
| Carbonate of Soda .. | ton | 157 | 7 | 187 | 7 | 208 | 4 | 204 | 6 | 193 | 6 | 196 | 3 |
| Saltpetre .. .. .. | ,, | 538 | 2 | 557 | 7 | 554 | 2 | 546 | 10 | 517 | 3 | 543 | 1 |
| Sulphur .. .. .. | ,, | 220 | 2 | 231 | 6 | 228 | 3 | 236 | 6 | 220 | 7 | 254 | 7 |

## Average Annual Wholesale Prices in Melbourne, 1871 to 1912—contd.

| COMMODITY. | UNIT. | 1895. | | 1896. | | 1897. | | 1898. | | 1899. | | 1900. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. |
| GROUP I. METALS— | | | | | | | | | | | | | |
| Iron—Pig Mixed Nos. .. | ton | 61 | 5 | 59 | 4½ | 70 | 4½ | 65 | 4½ | 81 | 7½ | 108 | 5½ |
| Rod and Bar .. | ,, | 158 | 0½ | 156 | 11 | 160 | 0 | 163 | 5½ | 210 | 0 | 260 | 0 |
| Angle and Tee .. | ,, | 182 | 6 | 184 | 3 | 190 | 0 | 190 | 11½ | 207 | 1½ | 266 | 11 |
| Plate .. .. .. | ,, | 180 | 0 | 181 | 2 | 185 | 0 | 185 | 0 | 205 | 9 | 263 | 10 |
| Hoop .. .. | ,, | 175 | 0 | 175 | 0 | 176 | 11 | 180 | 4½ | 212 | 4 | 271 | 2 |
| Galvanised Corrugated | ,, | 304 | 8 | 317 | 2 | 304 | 3 | 304 | 5 | 356 | 6½ | 392 | 11 |
| Wire, Fencing .. | ,, | 149 | 2½ | 157 | 5 | 166 | 3 | 170 | 2 | 200 | 6 | 230 | 2 |
| Zinc—Sheet .. .. | ,, | 520 | 8½ | 460 | 0 | 460 | 0 | 480 | 0 | 658 | 5½ | 704 | 3 |
| Lead—Sheet .. .. | ,, | 420 | 0 | 340 | 9 | 345 | 0 | 336 | 2 | 400 | 0 | 426 | 2 |
| Piping .. .. | ,, | 460 | 0 | 330 | 9 | 320 | 0 | 323 | 10 | 393 | 6½ | 442 | 1½ |
| Copper—Sheet .. .. | lb. | 0 | 8¾ | 0 | 8¾ | 0 | 8¾ | 0 | 8¾ | 0 | 8¾ | 0 | 8¾ |
| Coal (on Wharf) .. .. | ton | 13 | 9½ | 17 | 1 | 17 | 1 | 18 | 1 | 19 | 6 | 21 | 4½ |
| GROUP II TEXTILES, LEATHER, &c | | | | | | | | | | | | | |
| Jute Goods—Branbags .. | dozen | 3 | 5⅛ | 3 | 8¼ | 3 | 6⅝ | 3 | 2 | 3 | 5 | 3 | 11¾ |
| Cornsacks .. | ,, | 4 | 2¾ | 4 | 3⅛ | 4 | 3⅞ | 4 | 5½ | 5 | 5⅝ | 5 | 7 |
| Woolpacks .. | each | 1 | 7¼ | 1 | 4¾ | 1 | 4⅝ | 1 | 4¾ | 1 | 9⅝ | 1 | 10⅝ |
| Leather—Kip .. .. | lb. | 1 | 0⅝ | 1 | 1⅛ | 1 | 1 | 1 | 1 | 1 | 1⅛ | 1 | 3⅝ |
| Calf .. .. | ,, | 1 | 9¼ | 1 | 9¾ | 1 | 10⅞ | 2 | 0 | 2 | 0¼ | 2 | 5⅝ |
| Basils .. .. | dozen | 14 | 5 | 14 | 7 | 13 | 6 | 13 | 1 | 14 | 0 | 18 | 8 |
| Cotton—Raw .. .. | lb. | 0 | 4¼ | 0 | 5 | 0 | 4½ | 0 | 3⅞ | 0 | 4⅛ | 0 | 5⅝ |
| Silk—Raw .. .. .. | ,, | 12 | 7¾ | 12 | 6½ | 12 | 4 | 12 | 6¼ | 12 | 9¼ | 12 | 11¾ |
| Wool .. .. .. | ,, | 0 | 8⅛ | 0 | 8¾ | 0 | 8¼ | 0 | 8½ | 0 | 8⅞ | 0 | 10⅛ |
| GROUP III. AGRICULT'L PRODUCE | | | | | | | | | | | | | |
| Wheat .. .. .. | bushel | 2 | 10⅝ | 5 | 0¾ | 5 | 8⅛ | 3 | 8⅛ | 2 | 9¼ | 2 | 9½ |
| Flour .. .. .. | ton | 142 | 3 | 249 | 2 | 289 | 2 | 196 | 10 | 130 | 3 | 124 | 11 |
| Bran .. .. .. .. | bushel | 0 | 9 | 0 | 11½ | 0 | 10⅜ | 0 | 9⅛ | 0 | 7⅞ | 0 | 9½ |
| Pollard .. .. .. | ,, | 0 | 9⅞ | 1 | 1¾ | 1 | 1½ | 0 | 9⅜ | 0 | 8⅝ | 0 | 10¾ |
| Oats .. .. .. .. | ,, | 1 | 8¼ | 3 | 0 | 2 | 2¼ | 2 | 0⅛ | 1 | 8⅜ | 2 | 3 |
| Oatmeal .. .. .. | ton | 272 | 10 | 391 | 2 | 331 | 2 | 270 | 2 | 234 | 7 | 306 | 11 |
| Barley—Malting .. .. | bushel | 3 | 5¼ | 4 | 4½ | 4 | 5½ | 5 | 3¼ | 4 | 7⅛ | 3 | 4⅛ |
| Feed .. .. | ,, | 1 | 9⅛ | 3 | 3¼ | 2 | 8⅜ | 2 | 2½ | 1 | 11⅝ | 1 | 11¾ |
| Maize .. .. .. | ,, | 2 | 3⅝ | 3 | 5⅜ | 3 | 1⅜ | 2 | 8 | 2 | 10⅛ | 2 | 6 |
| Hay .. .. .. .. | ton | 68 | 11 | 92 | 11 | 84 | 2 | 69 | 2 | 56 | 10 | 59 | 9 |
| Straw .. .. .. | ,, | 39 | 9 | 57 | 6 | 49 | 1 | 36 | 9 | 31 | 2 | 32 | 2 |
| Peas .. .. .. .. | bushel | 2 | 3¼ | 3 | 9⅜ | 3 | 9 | 3 | 2 | 2 | 9⅛ | 3 | 3½ |
| Potatoes .. .. .. | ton | 29 | 4½ | 79 | 2 | 57 | 11 | 160 | 4 | 41 | 5½ | 50 | 11 |
| GROUP IV. DAIRY PRODUCE— | | | | | | | | | | | | | |
| Ham .. .. .. .. | lb. | 0 | 6⅝ | 0 | 7⅞ | 0 | 8½ | 0 | 9½ | 0 | 8½ | 0 | 8⅝ |
| Bacon .. .. .. | ,, | 0 | 5⅛ | 0 | 6⅜ | 0 | 7 | 0 | 7⅞ | 0 | 6⅞ | 0 | 6⅝ |
| Cheese .. .. .. | ,, | 0 | 4½ | 0 | 5¼ | 0 | 4⅞ | 0 | 6 | 0 | 4¼ | 0 | 5¾ |
| Butter .. .. .. | ,, | 0 | 8¼ | 0 | 9⅞ | 0 | 10¾ | 1 | 0⅛ | 0 | 9¼ | 0 | 9⅜ |
| Lard .. .. .. .. | ,, | 0 | 3⅞ | 0 | 5⅜ | 0 | 5¾ | 0 | 6⅛ | 0 | 4½ | 0 | 3⅞ |
| Eggs .. .. .. .. | dozen | 0 | 8⅝ | 1 | 0¼ | 1 | 0¼ | 0 | 11⅝ | 0 | 9⅝ | 0 | 9⅞ |
| Honey .. .. .. | lb. | 0 | 2¼ | 0 | 3¼ | 0 | 3⅜ | 0 | 4⅜ | 0 | 3¼ | 0 | 3⅞ |
| GROUP V. GROCERIES, &c.— | | | | | | | | | | | | | |
| Currants .. .. .. | lb. | 0 | 4⅝ | 0 | 4⅞ | 0 | 5¼ | 0 | 5½ | 0 | 4⅞ | 0 | 6½ |
| Raisins .. .. .. | ,, | 0 | 5½ | 0 | 5¾ | 0 | 7 | 0 | 7¼ | 0 | 7¾ | 0 | 7½ |
| Herrings .. .. .. | doz. 1 lb. tins | 5 | 6½ | 5 | 5⅞ | 5 | 7 | 5 | 7⅝ | 5 | 6¼ | 5 | 10¼ |
| Salmon .. .. .. | ,, | 7 | 0 | 7 | 2⅞ | 7 | 1½ | 6 | 11 | 7 | 0½ | 9 | 6¾ |
| Sardines .. .. .. | doz. hlvs | 5 | 6½ | 5 | 6¼ | 5 | 6⅜ | 5 | 4⅞ | 5 | 3⅞ | 5 | 6⅝ |
| Tea .. .. .. .. | lb. | 1 | 0⅝ | 1 | 0⅝ | 1 | 0⅜ | 1 | 0⅛ | 0 | 11⅞ | 0 | 11½ |
| Coffee .. .. .. | ,, | 1 | 1½ | 1 | 0⅞ | 1 | 1 | 1 | 0⅞ | 1 | 0 | 0 | 11¾ |
| Cocoa .. .. .. | ,, | 1 | 2⅜ | 1 | 2⅛ | 1 | 2⅛ | 1 | 2⅛ | 1 | 2⅛ | 1 | 2⅛ |
| Sugar .. .. .. | ton | 454 | 3 | 465 | 5 | 453 | 10 | 440 | 0 | 440 | 0 | 452 | 4 |
| Macaroni .. .. .. | lb. | 0 | 6⅛ | 0 | 5¾ | 0 | 5¾ | 0 | 6⅛ | 0 | 6¼ | 0 | 6⅛ |
| Sago .. .. .. | ,, | 0 | 1¼ | 0 | 1⅛ | 0 | 1 | 0 | 1⅛ | 0 | 1⅝ | 0 | 1¾ |
| Rice .. .. .. .. | ton | 377 | 2 | 382 | 9 | 406 | 0 | 443 | 0 | 416 | 6 | 414 | 7 |
| Salt—Fine .. .. .. | ,, | 75 | 0 | 71 | 3 | 73 | 7 | 74 | 11 | 74 | 10 | 72 | 6 |
| Rock .. .. .. | ,, | 47 | 6 | 43 | 3 | 40 | 3 | 47 | 5 | 44 | 11 | 40 | 3 |
| Mustard .. .. .. | doz. 1 lb. tins | 17 | 8¼ | 17 | 8¼ | 17 | 8¼ | 17 | 8¼ | 17 | 8¼ | 17 | 8¼ |
| Starch .. .. .. | lb. | 0 | 4¾ | 0 | 4¾ | 0 | 4¾ | 0 | 4¾ | 0 | 4¾ | 0 | 4¾ |
| Blue .. .. .. .. | ,, | 0 | 8¼ | 0 | 8¼ | 0 | 8¼ | 0 | 8¼ | 0 | 8¼ | 0 | 8¼ |
| Matches .. .. .. | gross | 1 | 3½ | 1 | 3⅝ | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 2½ |
| Candles .. .. .. | lb. | 0 | 7⅛ | 0 | 6⅛ | 0 | 5⅛ | 0 | 5⅜ | 0 | 6 | 0 | 6¾ |
| Kerosene .. .. .. | gallon | 0 | 9¼ | 0 | 9½ | 0 | 9⅛ | 0 | 8¼ | 0 | 9⅛ | 0 | 11½ |
| Tobacco .. .. .. | lb. | 4 | 6 | 4 | 6 | 4 | 6 | 4 | 6 | 4 | 6 | 4 | 6 |
| GROUP VI. MEAT— | | | | | | | | | | | | | |
| Beef .. .. .. .. | 100 lb. | 13 | 7 | 17 | 6½ | 20 | 7½ | 22 | 8¾ | 19 | 1¾ | 21 | 8¾ |
| Mutton .. .. .. | lb. | 0 | 1⅜ | 0 | 1½ | 0 | 2½ | 0 | 2⅛ | 0 | 1⅞ | 0 | 2¾ |
| Lamb .. .. .. | each | 5 | 6⅞ | 5 | 6⅜ | 7 | 1 | 7 | 9¼ | 7 | 5⅞ | 8 | 9⅝ |
| Veal .. .. .. .. | lb. | 0 | 1½ | 0 | 1½ | 0 | 2 | 0 | 2⅛ | 0 | 2¼ | 0 | 2½ |
| Pork .. .. .. .. | ,, | 0 | 3 | 0 | 3⅝ | 0 | 4⅜ | 0 | 5 | 0 | 4⅞ | 0 | 4 |
| GROUP VII. BUILDING MATERIAL | | | | | | | | | | | | | |
| Timber—Flooring—6 x 1⅛ | 100ft. lin | 7 | 4¾ | 7 | 5¾ | 8 | 1¼ | 8 | 5⅜ | 8 | 3⅝ | 9 | 1 |
| 6 x ⅞ | ,, | 6 | 2¼ | 6 | 9½ | 7 | 0 | 7 | 1⅛ | 6 | 9 | 7 | 5⅝ |
| 6 x ¾ | ,, | 5 | 7⅛ | 5 | 11⅝ | 6 | 4⅜ | 6 | 7½ | 6 | 0¼ | 6 | 6¾ |
| 6 x ½ | ,, | 4 | 0½ | 4 | 3⅜ | 4 | 7⅝ | 4 | 9¼ | 4 | 4 | 4 | 9⅛ |
| Weatherboards .. | ,, | 4 | 2½ | 4 | 4⅞ | 4 | 10⅝ | 5 | 2⅝ | 4 | 10⅝ | 5 | 1 |
| Oregon .. .. | 1000ft sp | 122 | 11 | 116 | 3 | 100 | 3½ | 125 | 1 | 124 | 0½ | 144 | 5 |
| Shelving .. .. | ,, | 216 | 1 | 214 | 7 | 218 | 6 | 215 | 9 | 193 | 6 | 224 | 3 |
| Cement .. .. .. | cask | 12 | 8⅜ | 12 | 7¼ | 12 | 10¾ | 14 | 6⅜ | 15 | 0 | 14 | 11½ |
| White Lead .. .. | ton | 540 | 0 | 537 | 0 | 537 | 4 | 568 | 6 | 638 | 6 | 786 | 2 |
| GROUP VIII. CHEMICALS— | | | | | | | | | | | | | |
| Cream of Tartar .. .. | lb. | 0 | 9⅝ | 0 | 11½ | 0 | 10 | 0 | 9½ | 0 | 9½ | 0 | 9¾ |
| Carbonate of Soda .. | ton | 190 | 7½ | 184 | 5 | 196 | 2 | 194 | 8½ | 154 | 3 | 149 | 0½ |
| Saltpetre .. .. .. | ,, | 568 | 11 | 562 | 8 | 524 | 7 | 523 | 6 | 527 | 4 | 530 | 0 |
| Sulphur .. .. .. | ,, | 285 | 4 | 175 | 0 | 166 | 0 | 157 | 6 | 163 | 6 | 172 | 4 |

## Average Annual Wholesale Prices in Melbourne, 1871 to 1912—contd.

| COMMODITY. | UNIT. | 1901. s. | 1901. d. | 1902. s. | 1902. d. | 1903. s. | 1903. d. | 1904. s. | 1904. d. | 1905. s. | 1905. d. | 1906. s. | 1906. d. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **GROUP I. METALS—** | | | | | | | | | | | | | |
| Iron—Pig Mixed Nos. .. | ton | 90 | 4½ | 77 | 6½ | 84 | 1 | 78 | 0 | 75 | 0 | 80 | 7 |
| Rod and Bar .. | ,, | 230 | 4½ | 191 | 2 | 180 | 11½ | 179 | 0½ | 177 | 10½ | 192 | 8 |
| Angle and Tee .. | ,, | 230 | 7 | 214 | 3 | 209 | 4½ | 205 | 0 | 195 | 0 | 197 | 4 |
| Plate .. .. .. | ,, | 226 | 4 | 212 | 8 | 209 | 4½ | 200 | 0 | 198 | 1 | 197 | 4 |
| Hoop .. .. | ,, | 253 | 0 | 225 | 0 | 215 | 0 | 206 | 4 | 195 | 7 | 198 | 10 |
| Galvanised Corrugated | ,, | 369 | 7 | 351 | 9 | 351 | 4 | 340 | 7 | 332 | 11 | 343 | 3 |
| Wire, Fencing .. | ,, | 183 | 11 | 164 | 9 | 165 | 8 | 153 | 3 | 160 | 9 | 170 | 2 |
| Zinc—Sheet .. .. | ,, | 616 | 11 | 549 | 3 | 548 | 7 | 560 | 9 | 640 | 9 | 696 | 11 |
| Lead—Sheet .. .. | ,, | 378 | 5½ | 281 | 11 | 294 | 3 | 290 | 0 | 337 | 8 | 417 | 4 |
| Piping .. .. | ,, | 364 | 9½ | 303 | 10 | 347 | 4 | 370 | 0 | 383 | 1 | 449 | 3 |
| Copper—Sheet .. .. | lb. | 0 | 8¾ | 0 | 8¾ | 0 | 9 | 0 | 9½ | 0 | 10 | 1 | 0⅛ |
| Coal (on Wharf) .. .. | ton | 23 | 9 | 23 | 0 | 19 | 11 | 15 | 8¾ | 14 | 6 | 17 | 3 |
| **GROUP II TEXTILES, LEATHER, &c** | | | | | | | | | | | | | |
| Jute Goods—Branbags | dozen | 4 | 0⅛ | 3 | 11⅛ | 3 | 6⅜ | 3 | 6⅛ | 3 | 9⅝ | 5 | 0¾ |
| Cornsacks .. | ,, | 5 | 1¼ | 4 | 5⅛ | 4 | 11⅝ | 5 | 9⅛ | 6 | 3 | 6 | 11⅛ |
| Woolpacks .. | each | 1 | 10½ | 1 | 8⅞ | 1 | 10 | 1 | 10½ | 2 | 1¼ | 2 | 4½ |
| Leather—Kip .. .. | lb. | 1 | 3⅞ | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 5⅝ |
| Calf .. .. | ,, | 2 | 3½ | 2 | 0 | 1 | 11½ | 1 | 6 | 1 | 6 | 2 | 2 |
| Basils .. .. | dozen | 18 | 0 | 18 | 0 | 18 | 0 | 18 | 0 | 18 | 0 | 23 | 2¾ |
| Cotton—Raw .. .. | lb. | 0 | 5½ | 0 | 5½ | 0 | 6 | 0 | 6¾ | 0 | 5¾ | 0 | 6⅝ |
| Silk—Raw .. .. .. | ,, | 11 | 6¼ | 11 | 7½ | 13 | 3¾ | 13 | 3 | 13 | 1¾ | 14 | 1¾ |
| Wool .. .. .. | ,, | 0 | 7⅞ | 0 | 7¾ | 0 | 8⅞ | 0 | 9½ | 0 | 10 | 0 | 11¼ |
| **GROUP III. AGRICULT'L PRODUCE** | | | | | | | | | | | | | |
| Wheat .. .. .. | bushel | 2 | 9¼ | 4 | 3½ | 5 | 2¼ | 3 | 2⅛ | 3 | 4¾ | 3 | 2¾ |
| Flour .. .. .. | ton | 122 | 4 | 183 | 7 | 231 | 8 | 151 | 2 | 148 | 8 | 142 | 9 |
| Bran .. .. .. .. | bushel | 0 | 9⅞ | 1 | 2⅝ | 1 | 0¼ | 0 | 7⅜ | 0 | 10 | 0 | 9⅞ |
| Pollard .. .. .. | ,, | 0 | 10¼ | 1 | 3⅜ | 1 | 2¼ | 0 | 7⅝ | 0 | 11¼ | 0 | 10¼ |
| Oats .. .. .. .. | ,, | 2 | 3¼ | 3 | 1⅞ | 2 | 8 | 1 | 10 | 2 | 1¾ | 2 | 8¼ |
| Oatmeal .. .. .. | ton | 288 | 3 | 391 | 6 | 335 | 9 | 215 | 9 | 243 | 1 | 300 | 0 |
| Barley—Malting .. .. | bushel | 3 | 3¼ | 4 | 5½ | 4 | 6½ | 3 | 5 | 3 | 11¼ | 4 | 6¾ |
| Feed .. | ,, | 2 | 0⅛ | 3 | 5⅜ | 3 | 2½ | 1 | 9½ | 2 | 2½ | 2 | 10¾ |
| Maize .. .. .. | ,, | 2 | 7 | 4 | 4 | 3 | 9 | 2 | 1¼ | 2 | 7¾ | 3 | 3 |
| Hay .. .. .. .. | ton | 95 | 5 | 111 | 5 | 117 | 1 | 71 | 8 | 77 | 1 | 78 | 9 |
| Straw .. .. .. | ,, | 33 | 1 | 48 | 9 | 52 | 6 | 28 | 4 | 31 | 3 | 33 | 9 |
| Peas .. .. .. .. | bushel | 3 | 5⅝ | 4 | 2½ | 4 | 2⅝ | 2 | 8 | 3 | 6⅛ | 3 | 8¼ |
| Potatoes .. .. .. | ton | 92 | 3½ | 101 | 1¾ | 54 | 4¾ | 41 | 4 | 132 | 1½ | 122 | 3¾ |
| **GROUP IV. DAIRY PRODUCE—** | | | | | | | | | | | | | |
| Ham .. .. .. .. | lb. | 0 | 9⅛ | 0 | 11⅛ | 0 | 10⅞ | 0 | 10¼ | 0 | 9⅝ | 0 | 9⅝ |
| Bacon .. .. .. | ,, | 0 | 7¼ | 0 | 8⅞ | 0 | 9⅛ | 0 | 7⅝ | 0 | 6½ | 0 | 6⅞ |
| Cheese .. .. .. | ,, | 0 | 7½ | 0 | 8⅞ | 0 | 7½ | 0 | 5 | 0 | 8⅛ | 0 | 7⅛ |
| Butter .. .. .. | ,, | 1 | 0⅛ | 1 | 2⅜ | 0 | 11½ | 0 | 9⅝ | 0 | 11⅝ | 0 | 11½ |
| Lard .. .. .. | ,, | 0 | 6 | 0 | 8¼ | 0 | 6⅛ | 0 | 4¼ | 0 | 4¾ | 0 | 5½ |
| Eggs .. .. .. .. | dozen | 0 | 11⅛ | 1 | 0 | 1 | 1¼ | 0 | 10½ | 0 | 9⅞ | 0 | 9¾ |
| Honey .. .. .. | lb. | 0 | 3¼ | 0 | 3⅝ | 0 | 3¼ | 0 | 3¼ | 0 | 2⅞ | 0 | 3 |
| **GROUP V. GROCERIES, &c.—** | | | | | | | | | | | | | |
| Currants .. .. .. | lb. | 0 | 6¾ | 0 | 4¼ | 0 | 3⅞ | 0 | 3⅞ | 0 | 3⅞ | 0 | 4⅜ |
| Raisins .. .. .. | ,, | 0 | 7⅝ | 0 | 7½ | 0 | 6⅝ | 0 | 5½ | 0 | 5⅞ | 0 | 6⅛ |
| Herrings .. .. .. | doz. 1 lb. tins | 6 | 0⅝ | 5 | 2⅝ | 4 | 7⅝ | 4 | 2⅝ | 3 | 11⅜ | 4 | 2½ |
| Salmon .. .. .. | ,, | 7 | 9¼ | 6 | 5⅞ | 6 | 4⅝ | 6 | 11⅛ | 6 | 9⅛ | 6 | 5 |
| Sardines .. .. .. | doz. hlvs | 5 | 9¾ | 4 | 11½ | 5 | 1⅛ | 4 | 7½ | 4 | 3¼ | 4 | 10½ |
| Tea .. .. .. .. | lb. | 0 | 11¼ | 0 | 7⅝ | 0 | 7¾ | 0 | 7¼ | 0 | 7¼ | 0 | 7⅜ |
| Coffee .. .. .. | ,, | 1 | 0½ | 1 | 5⅛ | 1 | 1½ | 1 | 2⅛ | 1 | 1¾ | 1 | 1½ |
| Cocoa .. .. .. | ,, | 1 | 2⅛ | 1 | 1½ | 1 | 1½ | 1 | 1⅛ | 1 | 0 | 1 | 0 |
| Sugar .. .. .. | ton | 457 | 6 | 411 | 8 | 408 | 1 | 402 | 10 | 435 | 1 | 401 | 7 |
| Macaroni .. .. .. | lb. | 0 | 5⅞ | 0 | 5⅛ | 0 | 5⅝ | 0 | 5¾ | 0 | 5½ | 0 | 5 |
| Sago .. .. .. .. | ,, | 0 | 1⅝ | 0 | 1⅞ | 0 | 1⅝ | 0 | 1⅝ | 0 | 1½ | 0 | 2¾ |
| Rice .. .. .. .. | ton | 443 | 0 | 463 | 6 | 462 | 0 | 450 | 9 | 445 | 0 | 452 | 0 |
| Salt—Fine .. .. .. | ,, | 76 | 7 | 70 | 0 | 70 | 0 | 67 | 6 | 67 | 6 | 67 | 6 |
| Rock .. .. .. | ,, | 50 | 11 | 58 | 3 | 50 | 7 | 42 | 6 | 46 | 5 | 33 | 0 |
| Mustard .. .. .. | doz. 1 lb. tins | 17 | 11⅜ | 18 | 5⅛ | 18 | 6 | 18 | 2¾ | 18 | 0 | 18 | 0 |
| Starch .. .. .. | lb. | 0 | 4½ | 0 | 4¾ | 0 | 4⅞ | 0 | 5⅛ | 0 | 5 | 0 | 5 |
| Blue .. .. .. .. | ,, | 0 | 8⅛ | 0 | 7¼ | 0 | 7¼ | 0 | 7¼ | 0 | 7¼ | 0 | 7¼ |
| Matches .. .. .. | gross | 1 | 4 | 1 | 8⅞ | 1 | 8⅛ | 1 | 9¾ | 1 | 10½ | 1 | 10⅛ |
| Candles .. .. .. | lb. | 0 | 6⅜ | 0 | 6½ | 0 | 6½ | 0 | 6⅜ | 0 | 6 | 0 | 6¼ |
| Kerosene .. .. .. | gallon | 0 | 10¾ | 0 | 7¾ | 0 | 8⅛ | 0 | 8 | 0 | 8¼ | 0 | 8⅞ |
| Tobacco .. .. .. | lb. | 4 | 7⅛ | 4 | 9 | 4 | 9 | 4 | 9 | 4 | 9 | 4 | 7⅞ |
| **GROUP VI. MEAT—** | | | | | | | | | | | | | |
| Beef .. .. .. .. | 100 lb. | 27 | 11 | 31 | 1¼ | 28 | 5¼ | 23 | 3¾ | 21 | 5½ | 21 | 7¾ |
| Mutton .. .. .. | lb. | 0 | 2⅞ | 0 | 3 | 0 | 3⅛ | 0 | 3¾ | 0 | 3 | 0 | 2⅜ |
| Lamb .. .. .. | each | 9 | 4¾ | 8 | 5¾ | 9 | 10⅛ | 11 | 1¾ | 10 | 4 | 9 | 3½ |
| Veal .. .. .. .. | lb. | 0 | 2⅝ | 0 | 2⅜ | 0 | 2⅜ | 0 | 2⅞ | 0 | 2⅛ | 0 | 2⅛ |
| Pork .. .. .. .. | ,, | 0 | 4¾ | 0 | 5⅞ | 0 | 6⅜ | 0 | 5⅜ | 0 | 4⅛ | 0 | 4¼ |
| **GROUP VII. BUILDING MATERIAL** | | | | | | | | | | | | | |
| Timber—Flooring—6 x 1⅛ | 100ft. lin | 9 | 6 | 10 | 0 | 10 | 4⅝ | 10 | 4 | 9 | 4⅜ | 9 | 6¼ |
| 6 x ⅞ | ,, | 7 | 3¾ | 8 | 0 | 8 | 9¾ | 8 | 8 | 7 | 3 | 7 | 8¾ |
| 6 x ¾ | ,, | 6 | 8½ | 7 | 0 | 7 | 3¾ | 7 | 4⅛ | 6 | 6⅛ | 6 | 6 |
| 6 x ½ | ,, | 4 | 10 | 5 | 3 | 5 | 8 | 5 | 6 | 4 | 6¾ | 5 | 1 |
| Weatherboards .. | ,, | 4 | 11⅞ | 5 | 6 | 6 | 0¾ | 6 | 1⅝ | 5 | 5⅛ | 5 | 10⅛ |
| Oregon .. .. | 1000ft sp | 115 | 5 | 110 | 1 | 120 | 2 | 109 | 1½ | 103 | 3 | 127 | 1 |
| Shelving .. .. | ,, | 228 | 0 | 232 | 10½ | 236 | 8 | 231 | 8¾ | 239 | 7 | 255 | 0 |
| Cement .. .. .. | cask | 14 | 10 | 13 | 1¼ | 12 | 0 | 11 | 10 | 12 | 2 | 11 | 5¼ |
| White Lead .. .. | ton | 691 | 6 | 581 | 6 | 530 | 0 | 532 | 1 | 508 | 1 | 553 | 6 |
| **GROUP VIII. CHEMICALS—** | | | | | | | | | | | | | |
| Cream of Tartar .. .. | lb. | 0 | 9⅞ | 0 | 9⅜ | 0 | 10 | 0 | 9½ | 0 | 8⅞ | 0 | 8¾ |
| Carbonate of Soda .. | ton | 144 | 11 | 138 | 4 | 134 | 6 | 138 | 3 | 163 | 2 | 180 | 0 |
| Saltpetre .. .. .. | ,, | 520 | 0 | 506 | 2 | 527 | 8 | 488 | 1 | 478 | 1 | 490 | 9 |
| Sulphur .. .. .. | ,, | 183 | 4 | 184 | 7 | 166 | 4 | 158 | 6 | 161 | 2 | 161 | 6 |

## Average Annual Wholesale Prices in Melbourne, 1871 to 1912—contd.

| COMMODITY. | UNIT. | 1907. | 1908. | 1909. | 1910. | 1911. | 1912.* |
|---|---|---|---|---|---|---|---|
| | | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. |
| GROUP I. METALS— | | | | | | | |
| Iron—Pig Mixed Nos. .. | ton | 81 3 | 79 5 | 79 5 | 81 0 | 81 2 | 82 2 |
| Rod and Bar .. | ,, | 201 5 | 204 3 | 195 9 | 195 4½ | 191 2 | 210 9 |
| Angle and Tee .. | ,, | 211 5 | 215 0 | 205 0 | 197 8 | 195 0 | 201 3 |
| Plate .. .. .. | ,, | 211 5 | 213 5½ | 195 2 | 192 1½ | 192 6 | 200 3 |
| Hoop .. .. | ,, | 210 6½ | 216 11 | 212 8 | 209 7½ | 203 10 | 211 6 |
| Galvanised Corrugated | ,, | 393 2½ | 370 0 | 366 4 | 354 8½ | 347 5 | 354 6 |
| Wire, Fencing .. | ,, | 175 7½ | 155 3½ | 162 2 | 171 4 | 169 3 | 156 10½ |
| Zinc—Sheet .. .. | ,, | 761 5 | 667 8 | 613 10 | 601 6½ | 673 10 | 729 6 |
| Lead—Sheet .. .. | ,, | 465 8½ | 366 2 | 341 2 | 322 1½ | 315 11 | 377 6 |
| Piping .. .. | ,, | 490 8½ | 430 4½ | 421 2 | 405 2 | 367 3 | 419 4 |
| Copper—Sheet .. .. | lb. | 1 1½ | 0 11⅞ | 0 10⅝ | 0 9⅝ | 0 9¼ | 0 9⅞ |
| Coal (on Wharf) .. .. | ton | 21 6 | 22 6 | 22 6 | 22 6 | 22 6 | 22 6 |
| GROUP II TEXTILES, LEATHER, &c | | | | | | | |
| Jute Goods—Branbags .. | dozen | 5 3 | 4 4⅝ | 3 8½ | 3 5⅛ | 4 0½ | 5 11 |
| Cornsacks .. | ,, | 7 0 | 5 6¼ | 4 9⅝ | 4 9⅛ | 5 3½ | 5 7⅞ |
| Woolpacks .. | each | 2 8⅞ | 2 3 | 2 1 | 2 1⅞ | 2 4⅝ | 2 8⅝ |
| Leather—Kip .. .. | lb. | 1 6 | 1 5⅝ | 1 5 | 1 6⅞ | 1 7⅛ | 1 7 |
| Calf .. .. | ,, | 2 3½ | 2 3½ | 2 3⅛ | 2 3⅞ | 2 4⅝ | 2 4½ |
| Basils .. .. | dozen | 25 0 | 23 10⅛ | 22 6 | 20 7 | 20 0 | 20 0 |
| Cotton—Raw .. .. | lb. | 0 7⅛ | 0 6½ | 0 6⅝ | 0 8¾ | 0 7¾ | .. |
| Silk—Raw .. .. .. | ,, | 15 4¼ | 12 0½ | 11 6 | 11 10¼ | 11 10 | .. |
| Wool .. .. .. .. | ,, | 0 11⅛ | 0 9⅝ | 0 10⅛ | 0 10⅞ | 0 10⅝ | .. |
| GROUP III. AGRICULT'L PRODUCE | | | | | | | |
| Wheat .. .. .. | bushel | 3 9 | 4 2 | 4 7 | 3 10¼ | 3 6¼ | 4 0⅝ |
| Flour .. .. .. | ton | 168 10 | 179 3 | 206 11 | 180 9 | 160 5 | 175 4½ |
| Bran .. .. .. .. | bushel | 0 10½ | 1 2¼ | 0 10½ | 0 10⅞ | 0 11½ | 1 2 |
| Pollard .. .. .. | ,, | 0 10⅞ | 1 2⅞ | 1 0⅜ | 0 10⅞ | 0 11½ | 1 2⅞ |
| Oats .. .. .. .. | ,, | 2 8 | 2 11 | 2 2½ | 2 4¾ | 2 4½ | 3 3⅛ |
| Oatmeal .. .. .. | ton | 323 6 | 383 6 | 291 11 | 302 4 | 311 10 | 414 6 |
| Barley—Malting .. .. | bushel | 4 6½ | 4 11¼ | 3 11 | 4 1 | 4 9 | 6 1 |
| Feed .. .. | ,, | 2 9 | 3 8¼ | 2 5¾ | 2 4 | 2 6 | 4 9⅛ |
| Maize .. .. .. | ,, | 3 2 | 4 3 | 3 11¼ | 2 7¾ | 2 9⅛ | 4 1¼ |
| Hay .. .. .. .. | ton | 93 9 | 137 6 | 85 5 | 87 1 | 98 9 | 117 9 |
| Straw .. .. .. | ,, | 38 4 | 56 6 | 41 3 | 34 7 | 32 11 | 36 5 |
| Peas .. .. .. .. | bushel | 3 4¾ | 3 11¼ | 4 6⅜ | 4 10⅜ | 3 11¼ | 4 1 |
| Potatoes .. .. .. | ton | 50 8 | 86 9¾ | 75 9½ | 98 5½ | 80 7½ | 157 6 |
| GROUP IV. DAIRY PRODUCE— | | | | | | | |
| Ham .. .. .. .. | lb. | 0 10¾ | 0 11½ | 1 0⅛ | 1 0¼ | 0 11⅜ | 1 0½ |
| Bacon .. .. .. | ,, | 0 7¾ | 0 8¾ | 0 8½ | 0 7⅞ | 0 6¾ | 0 9⅜ |
| Cheese .. .. .. | ,, | 0 7¾ | 0 10 | 0 8¾ | 0 7⅛ | 0 7⅝ | 0 10⅝ |
| Butter .. .. .. | ,, | 0 11¾ | 1 1⅞ | 1 0¾ | 0 11⅜ | 0 11½ | 1 2⅛ |
| Lard .. .. .. .. | ,, | 0 5¾ | 0 8⅛ | 0 6½ | 0 6⅛ | 0 5⅝ | 0 6¾ |
| Eggs .. .. .. .. | dozen | 0 10⅝ | 1 0¼ | 1 0⅜ | 0 11½ | 1 0 | 1 2 |
| Honey .. .. .. | lb. | 0 2¾ | 0 3⅛ | 0 3 | 0 3¼ | 0 3 | 0 3¼ |
| GROUP V. GROCERIES, &c.— | | | | | | | |
| Currants .. .. .. | lb. | 0 5¼ | 0 5⅝ | 0 5⅝ | 0 5¾ | 0 5⅞ | 0 5¾ |
| Raisins .. .. .. | ,, | 0 7¼ | 0 6¾ | 0 6¼ | 0 6¾ | 0 6⅝ | 0 6¾ |
| Herrings .. .. .. | doz. 1 lb. tins | 4 9¼ | 4 6¾ | 4 6¼ | 4 6¾ | 4 5¾ | 4 6 |
| Salmon .. .. .. | ,, | 6 1⅛ | 7 0⅝ | 6 10½ | 7 4⅞ | 8 10⅝ | 9 7⅜ |
| Sardines .. .. .. | doz. hlvs | 5 0⅛ | 5 0 | 5 1¼ | 5 0 | 5 1½ | 5 1½ |
| Tea .. .. .. .. | lb. | 0 8⅛ | 0 8 | 0 8¼ | 0 8¼ | 0 9 | .. |
| Coffee .. .. .. | ,, | 1 1½ | 1 1½ | 1 1½ | 1 1½ | 1 1½ | 1 2½ |
| Cocoa .. .. .. | ,, | 1 0⅜ | 1 1½ | 1 1½ | 1 1½ | 1 1½ | 1 1½ |
| Sugar .. .. .. | ton | 395 4 | 413 6 | 426 6 | 448 0 | 437 6 | 480 6 |
| Macaroni .. .. .. | lb. | 0 5¼ | 0 5¼ | 0 5¼ | 0 5½ | 0 5¾ | 0 3¼ |
| Sago .. .. .. .. | ,, | 0 3 | 0 1⅞ | 0 1⅞ | 0 1¾ | 0 2⅛ | 0 2¼ |
| Rice .. .. .. .. | ton | 498 0 | 507 4 | 495 0 | 486 2 | 466 2 | 526 0 |
| Salt—Fine .. .. .. | ,, | 70 2 | 75 6 | 81 3 | 81 3 | 81 3 | 81 3 |
| Rock .. .. .. | ,, | 49 11 | 60 2 | 48 1 | 43 3 | 46 3 | 50 6 |
| Mustard .. .. .. | doz. 1 lb. tins | 18 4¼ | 19 0 | 19 0 | 19 0 | 19 0 | 19 0 |
| Starch .. .. .. | lb. | 0 5 | 0 5 | 0 5 | 0 5 | 0 5 | 0 5 |
| Blue .. .. .. .. | ,, | 0 7⅝ | 0 8⅜ | 0 8⅜ | 0 8⅜ | 0 8¾ | 0 8⅜ |
| Matches .. .. .. | gross | 2 4½ | 2 8¾ | 2 5⅞ | 2 2⅞ | 2 1 | 2 1¼ |
| Candles .. .. .. | lb. | 0 7¼ | 0 7¼ | 0 7¼ | 0 7¼ | 0 7¼ | 0 7¼ |
| Kerosene .. .. .. | gallon | 0 9¼ | 0 9⅞ | 0 9⅞ | 0 9⅞ | 0 9⅞ | 0 10⅛ |
| Tobacco .. .. .. | lb. | 4 7¼ | 4 7¼ | 4 7¼ | 4 7¼ | 4 7¼ | 4 10¼ |
| GROUP VI. MEAT— | | | | | | | |
| Beef .. .. .. .. | 100 lb. | 26 3½ | 28 3¾ | 23 0¼ | 19 9½ | 18 10 | 24 6 |
| Mutton .. .. .. | lb. | 0 2¾ | 0 2⅝ | 0 2 | 0 2 | 0 2⅛ | 0 3 |
| Lamb .. .. .. .. | each | 9 1¾ | 9 2¼ | 8 3¾ | 8 0⅜ | 8 10¾ | 9 10⅜ |
| Veal .. .. .. .. | lb. | 0 2⅛ | 0 2⅜ | 0 2 | 0 2 | 0 2 | 0 2⅜ |
| Pork .. .. .. .. | ,, | 0 5 | 0 5⅝ | 0 6 | 0 5¼ | 0 4⅜ | 0 4¼ |
| GROUP VII. BUILDING MATERIAL | | | | | | | |
| Timber—Flooring—6 x 1½ | 100ft lin | 10 4 | 10 3¾ | 10 3⅛ | 10 11¼ | 11 0 | 11 0¾ |
| 6 x ⅞ | ,, | 8 4 | 7 11 | 8 1¼ | 9 7¼ | 8 9⅞ | 8 5¾ |
| 6 x ¾ | ,, | 7 5⅜ | 7 2 | 7 1⅜ | 8 1½ | 8 0½ | 7 7 |
| 6 x ½ | ,, | 5 3¼ | 5 1¾ | 5 3 | 6 0¼ | 5 9⅝ | 5 5⅜ |
| Weatherboards .. | ,, | 6 2⅞ | 5 9¾ | 5 6⅛ | 7 0 | 6 7⅛ | 6 1½ |
| Oregon .. .. | 1000ft sp | 134 8 | 113 10 | 107 3¾ | 111 3 | 118 3 | 131 11½ |
| Shelving .. .. | ,, | 280 8½ | 305 0 | 306 6½ | 330 0 | 325 5 | 335 0 |
| Cement .. .. .. | cask | 12 0⅝ | 12 11 | 11 11½ | 12 8 | 13 5 | 14 8 |
| White Lead .. .. .. | ton | 629 3 | 585 5 | 560 5 | 567 8 | 602 4 | 713 6 |
| GROUP VIII. CHEMICALS— | | | | | | | |
| Cream of Tartar .. .. | lb. | 0 9⅞ | 0 9 | 0 8 | 0 9¼ | 0 10⅝ | 0 9⅝ |
| Carbonate of Soda .. | ton | 186 9 | 182 1 | 162 6 | 164 9 | 167 6 | 166 6 |
| Saltpetre .. .. .. | ,, | 597 10 | 582 8 | 592 4 | 660 0 | 660 0 | 660 0 |
| Sulphur .. .. .. | ,, | 175 8 | 160 0 | 166 2 | 160 9 | 173 1 | 192 6 |

* First 9 Months.

# APPENDIX VII.

## FORMS USED FOR COLLECTION OF DATA AS TO RETAIL PRICES AND HOUSE RENT.

*Town* ______ *State* ______

*Office No. R.P.2/....*

### RETAIL PRICES.

*Name* ______

*Address* ______

This half-sheet is to be detached and posted to the "Commonwealth Statistician," Melbourne.

*In filling in this form please follow Instructions carefully.*

***January, 191...***

| ARTICLE. | | UNIT OF QUANTITY. | Predominant or Most Frequent Price.† s. | d. |
|---|---|---|---|---|
| Bread ... ... ... ... | | Per 2-lb. loaf ... | | |
| Butter ... ... ... ... | | ,, lb. ... ... | | |
| Cheese | New ... ... ... | ,, lb. ... ... | | |
| | Matured ... ... | ,, lb. ... ... | | |
| Eggs | New laid ... ... | ,, dozen ... | | |
| | Fresh ... ... ... | ,, ,, ... | | |
| Flour | Ordinary ... ... | ,, 25-lb. bag ... | | |
| | Self-raising ... ... | ,, *......lbs. packet | | |
| Tea ... ... ... ... | | ,, lb. ... ... | | |
| Coffee ... ... ... ... | | ,, lb. ... ... | | |
| Cocoa ... ... ... ... | | ,, ½ lb.... ... | | |
| Bacon | Middle cut ... ... | ,, lb. ... ... | | |
| | Shoulder ... ... | ,, lb. ... ... | | |
| | Ham ... ... ... | ,, lb. ... ... | | |
| Sugar (white granulated A1) ... | | ,, *......lbs. ... | | |
| Rice ... ... ... ... | | ,, lb. ... ... | | |
| Sago ... ... ... ... | | ,, lb. ... ... | | |
| Jam (Australian) ... ... | | ,, *......lbs. tin | | |
| Oatmeal ... ... ... ... | | ,, *......lbs. ... | | |
| Raisins ... ... ... ... | | ,, lb. ... ... | | |
| Currants ... ... ... ... | | ,, lb. ... ... | | |
| Starch ... ... ... ... | | ,, lb. ... ... | | |
| Blue ... ... ... ... | | ,, dozen squares | | |
| Candles ... ... ... ... | | ,, lb. ... ... | | |
| Soap (household, ordinary) ... | | ,, *......lbs. bar | | |
| Potatoes ... ... ... ... | | ,, 14 lbs. ... | | |
| Onions ... ... ... ... | | ,, lb. ... ... | | |
| Kerosene ... ... ... ... | | ,, gallon ... | | |

* Enter quantity most frequently sold.
† See instructions, paragraph 4.

REMARKS (Enter here the cause of any material advance or decline in the price of any article since the middle of last month)..............

______

______

(Continue remarks on back of sheet, if necessary.)

*Town* ______ *State* ______

*Office No. R.P 5/ ..*

### RETAIL PRICES.

*Name* ______

*Address* ______

This quarter sheet is to be detached and posted to the "Commonwealth Statistician," Melbourne.

*In filling in this form please follow Instructions carefully.*

***January, 191..***

| Particulars. | Cash Price. d. |
|---|---|
| Milk ... ... ... ... per quart | |

REMARKS (Enter here the cause of any material advance or decline in the price of any article since the middle of last month)..............

______

*Town* ______ *State* ______

*Office No. R.P. 3/....*

### RETAIL PRICES.

*Name* ______

*Address* ______

This half-sheet is to be detached and posted to the "Commonwealth Statistician," Melbourne.

*In filling in this form please follow Instructions carefully.*

***January, 191...***

| ARTICLE. | | Predominant or Most Frequent Price.* s. | d. |
|---|---|---|---|
| Beef (fresh) Sirloin ... ... ... | per lb. | | |
| Ribs ... ... ... ... | ,, | | |
| Flank ... ... ... | ,, | | |
| Shin (without bone) Gravy Beef ... | ,, | | |
| Steak—Rump ... ... ... | ,, | | |
| Shoulder ... ... ... | ,, | | |
| Stewing (Buttock) ... ... | ,, | | |
| Beef (Corned)—Round ... ... | ,, | | |
| Brisket (with bone) ... ... | ,, | | |
| ,, (without bone ... ... | ,, | | |
| Mutton—Legs ... ... ... | ,, | | |
| Shoulders ... ... ... | ,, | | |
| Loins... ... ... ... | ,, | | |
| Necks ... ... ... | ,, | | |
| Chops—Loin ... ... ... | ,, | | |
| Leg ... ... ... ... | ,, | | |
| Neck ... ... ... ... | ,, | | |
| Lamb—Forequarter ... ... ... | ,, | | |
| Hindquarter ... ... ... | ,, | | |
| Pork (fresh)—Leg ... ... ... | ,, | | |
| Loin ... ... ... ... | ,, | | |
| Belly ... ... ... ... | ,, | | |
| Chops ... ... ... | ,, | | |

* See instructions, paragraph 4.

REMARKS (Enter here the cause of any material advance or decline in the price of any article since the middle of last month)..............

______

(Continue remarks on back of sheet, if necessary)

*Town* ______ *State* ______

*District or Suburb* ______ *Office No. R.P. 16/.... ....*

### WEEKLY HOUSE RENTS.

Particulars required under the Census and Statistics Act, 1905.

*Name of Agent* ______

*Address* ______

This slip is to be detached and posted to the "Commonwealth Statistician," Melbourne.

In filling up this form please follow Instructions carefully.

RETURN FOR QUARTER ENDING 30th MARCH, 191

| Nature of House. | Under 4 rooms. | | 4 Rooms. | | 5 Rooms. | | 6 Rooms. | | 7 Rooms. | | 8 Rooms and over. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. | s. | d. |
| Wood ... | | | | | | | | | | | | |
| Brick, &c. | | | | | | | | | | | | |

REMARKS—(Enter here the cause of any advance or decline in rents since the preceding quarter) ______

______

______

(Continue remarks on back of sheet, if necessary.)

# APPENDIX VIII.

## THEORY OF DETERMINING PRICE-INDEXES SHEWING VARIATIONS IN THE EXCHANGE-VALUE OF GOLD, OR IN THE COST OF LIVING.

BY G. H. KNIBBS, C.M.G., F.R.A.S., F.S.S., ETC., ETC.
*Federal Statistician, Australia.*

---

### SYNOPSIS.



---

1. **General Theory of Determining Price-Indexes.**—The *exchange-value* or *purchasing-efficiency* of money is measured by the amount of any commodity which a unit of money (£1 say) will purchase; or it is measured in a reciprocal way by the amount of money or *price* which has to be paid for a unit of the commodity in question. The latter measure is, of course, a reciprocal of the former, that is, the exchange-value or money-purchasing efficiency of the commodity is measured by the quantity of money which a unit of the commodity will buy, or for which it can be exchanged. It is convenient, and is the custom, to express exchange-values through price. When the price of a commodity changes (for example, when it becomes greater) it denotes change of (reduced) efficiency in the purchasing-power or exchange-value of money with respect to that commodity. Thus if a thing that originally cost £4, at some later date costs £5, the *price* has *advanced* in the ratio from 1 to $\frac{5}{4}$ or 25%, or the efficiency of the *purchasing-power* or exchange-value of money has, in respect of the commodity in question, *fallen* from 1 to $\frac{4}{5}$, or 20%, the two statements being virtually the same. The ratio of the price at one date to that at another is called its *price-ratio* in respect of those dates. It has become customary for economists to regard every instance of a rise or fall in price in a particular commodity as an *individual measure of a variation in the exchange-value of money*, a measure which has value or weight in proportion as expenditure upon the commodity in question enters into the aggregate of expenditure upon the whole series of commodities of which it forms a single member. The term "exchange-value" is to be preferred because it is unambiguous; "value" without qualification might denote utility-value, esteem-value, cost-value, etc. Here it may be remarked that the method of determining variations of the exchange-value of gold by means of price-ratios, is not a good one, as is shewn hereinafter, and the only satisfactory method is that of aggregate expenditures for a given regimen.

Now it is obvious that if, in a series of commodities, the quantity used in a given period be constant for each commodity, the measure of the economic importance or *economic "weight"* of each is the relative expenditure in money units on that member of the series.* Hence through statistics we may obtain some idea of this measure or "weight." Weight in this sense has, of course, no direct connection with physical weight.

When prices have changed, however, the "weights" will have changed also, unless the quantities of the commodities have changed so as to leave the expenditures (or quantities multiplied by the price) the same. Ordinarily it may of course be said that the "weights" will have changed. Now there can be no *real* comparison of the relative purchasing-power or exchange-value of money, except on some supposition of constancy in human requirements, and just in proportion as the usage of different commodities varies so will any estimate of relative purchasing-power become dubious. In short, a fixed regimen is essential for an accurate determination.

In some instances human requirements are fairly constant. If we suppose that, for an "average" member of the community, a *particular regimen be adhered to*, then clearly we may tabulate the aggregate expenditure on that regimen at two dates; and the expenditure thereon at the later date, divided by the expenditure at the former, will measure the *expenditure-ratio* for the two dates. Thus, for example, if we suppose it to *increase*, it will represent a *rise* in the cost of the commodities. The reciprocal of this ratio or relative increase measures the decrease in the purchasing-power of money with respect to the particular regimen.

If the regimen itself vary, any computation of the change in question is dubious, *because it contains two elements*, viz. :—

(i.) Change in the regimen itself, *i.e.*, change in the use of the commodities (or *standard of living*), and

(ii.) Change in the expenditure on the cost of the individual elements in the regimen.

Where the regimen changes either in virtue of the changes in price, arbitrarily, or in response to changes in the "standard of living," etc., there are still *assumptions by means of which accurate comparisons can be made.* Thus we may make several definite suppositions, for example :—(*a*) that the quantities at the former date apply to the later, and thus compute what the effect of changed price would be; or (*b*) we may, on the other hand, suppose that the quantities used at the second date were actually those at the earlier date, and can again compute the aggregate cost of the regimen on this assumption. Both of these comparisons are, in their way, valid, intelligible, and respond to certain questions of sociological importance that from time to time arise, and which for certain purposes demand an answer. The best *general* assumption (*c*) is, of course, that some mean-value of the "weights" applies: this mean may be arithmetic, geometric, or harmonic; and any one of these means may naturally arise. It is shewn hereinafter that the geometric mean is doubtless the most accurate generally, but that in certain cases the arithmetic may be used.

If we have price-ratios for a series of commodities, and deduce from them some general ratio that expresses for the series in question the price on the whole at the second date, as compared with the former, such a ratio is called the *price-index* of the latter date.

The nature of the combination of the price-ratios in the calculation of a price-index, even when the relative weights are decided, is a matter for consideration. It is essential, for example, for satisfactory comparisons that a series of price-indexes which profess to express changes in the purchasing-power of money shall furnish the same relation between the purchasing-power at any two dates, as would be furnished by calculating by the method approved from the original data for the two dates. If this were not so, then obviously the index-numbers do not fulfil their profession; in short, they are misleading.

Index-values, as ordinarily furnished, are unfortunately subject to this criticism, viz., that they cannot, in the nature of the case, be assumed to represent intelligibly the relation required, at least with *sufficient* precision to answer many practical questions. This may be readily seen by comparing any two series of price-indexes.

2. **Price-Indexes from Relative Total Expenditures and from Price-Ratios.**—For a series of *commodities* A, B, C, the *price* at a certain date is $a_0$, $b_0$, $c_0$, etc.; at some later date it is $a_1$, $b_1$, $c_1$, etc. The *quantities* of these commodities may be denoted by $\alpha$, $\beta$, $\gamma$, etc., with suffixes 0 and 1 according to the date. The *unit* by which any commodity A, B, or C, etc., is measured may of course be anything whatever,

* Forasmuch as the money-unit constitutes a unique common measure of exchange-values.

as a pound avoirdupois, a gallon, a gross, an article, etc. The *price-ratio* at the latter date as compared with the former ordinarily varies with the commodity used to determine it. Thus it may be written :—

$$(1) \ldots\ldots \; {}_0p_1 = \frac{a_1}{a_0}; \quad {}_0q_1 = \frac{b_1}{b_0}; \quad {}_0r_1 = \frac{c_1}{c_0}; \text{ etc.,}$$

according as commodity A, B, or C, etc., is used. In attempting to utilise these price-ratios $p$, $q$, $r$, etc., for any general deduction, the *relative-weight* which should be ascribed to each obviously demands consideration. If the quantities or *mass-units* used were *identical at each date*, and were, say, $\alpha$, $\beta$, $\gamma$, etc., we should have a general price-ratio $I$, determined as follows, viz. :—

$$(2) \ldots\ldots \; {}_0I_1 = \frac{P_1}{P_0} = \frac{\alpha a_1 + \beta b_1 + \gamma c_1 + \text{etc.}}{\alpha a_0 + \beta b_0 + \gamma c_0 + \text{etc.}}$$

$P_0$ and $P_1$, denoting total expenditure on commodities A, B, C, etc., and ${}_0I_1$ the deduced *general price-index* for the dates in question. This formula is one which, for example, would give the *relative cost of living* at the two dates, on the assumption that the commodities, A, B, C, etc., represented the standard of living, and that the quantities of them which were consumed were identical at the two dates. The formula given (2) is unquestionably the only proper formula to use in such a case, and it may be shewn that it is the best formula in all cases. See hereinafter.

To clearly illustrate the matter, suppose, for example, that at the two dates this consumption for some given unit of time was, let us say, uniformly ten 4-lb. loaves, 1 pound of tea, and 5 quarts of milk.* Suppose further that the prices at date 0 were respectively 5d. per loaf, 15d. per lb., and 6d. per quart, and at date 1 6d. per loaf, 24d. per lb., and 4d. per quart. Then on this assumption the actual cost of living (so far as these items are concerned) would have risen from 95d. to 104d., that is in the ratio of 100 to 109.47, or in other words, there would be a 9.47% increase in the "cost of living."†

A method very commonly employed, however, for estimating changes of this kind is to ascertain the *price-ratio* for each commodity, that is, to find the quantities $p$, $q$, $r$, etc., by dividing the price per unit at the second date by that at the first, and to take a mean of all for a general result.‡ The price-ratio is, of course, independent of the size of the unit. These quotients are commonly multiplied by 100 for mere convenience.

As reliance upon price-ratios and combinations of them is very common, the question will be referred to at some length.

If price-ratios were really of equal weight we should have

$$(3) \ldots\ldots \; I' = \frac{1}{n} \left( p + q + r + \text{etc. to } n \text{ terms} \right); \text{ or}$$

$$(4) \ldots\ldots \; I'' = \sqrt[n]{\phantom{x}} \left( p.\, q.\, r. \text{ etc. to } n \text{ terms} \right); \text{ or}$$

$$(5) \ldots\ldots \; I''' = \frac{1}{\frac{1}{n}\left(\frac{1}{p} + \frac{1}{q} + \frac{1}{r} + \text{etc.}\right)} = \frac{n\,(p.\, q.\, r. \text{ etc.})}{(qr\ldots)+(pr\ldots)+(pq..)+\text{etc.}}$$

according as we preferred the *arithmetic*, the *geometric*, or the *harmonic* mean. Which of these is to be preferred is a point to which we shall refer later. The arithmetic, geometric and harmonic means all assume that each commodity is of equal importance in the result, but which is the proper one to adopt depends on other considerations of a more complex character. Popularly the arithmetic mean, viz., the ordinary average, is supposed to be satisfactory, but this is an error arising ordinarily from the fact that what underlies such an assumption is not apparent. Taking

---

* The consumption per head per annum is about 32 loaves of bread, 3 lbs. of tea, and 16 quarts of milk.

† Here it may be mentioned that computed from the geometric mean of the price-ratios, weighted according to the arithmetic mean of the weights, we should obtain 109.53. See next section.

‡ This method is wholly unsatisfactory.

the example just quoted, and regarding the evidence of each commodity as to rise of price as of equal value, we should have the following results according as we take one or the other mean, viz. :—

| | *Arithmetic Mean.* | | *Geometric Mean.* | | *Harmonic Mean.* |
|---|---|---|---|---|---|
| (A) | 1.20 | | 1.20 | | $\frac{5}{6}$ |
| (B) | 1.60 | | 1.60 | | $\frac{15}{24}$ |
| (C) | 0.6667 | | 0.6667 | | $\frac{6}{4}$ |
| Sum | 3.4667 | Product | 1.280 | Sum | $\frac{71}{24}$ |
| | (Divisor 3.) | | (Root, Cube) | | (Divisor 3) |
| | | 100 × Result, Cube Root | | Quotient | $\frac{71}{72}$ |
| 100 × Quotient, | 115.56 | | 108.58 | 100 × Reciprocal | 101.41 |

Result by ratio of aggregate of expenditures = 109.47.

Thus we have four results, viz., by formula (2), viz., the ratio of total expenditure 109.47% ; by formula (3) based on the unweighted arithmetic mean 115.56 ; by formula (4) based on the unweighted geometric mean 108.58 ; and by formula (5) based on the unweighted harmonic mean 101.41. And it may be added that had we used formula (2) with *one* unit of each (*i.e.*, $\alpha = \beta = \gamma = 1$) we should have obtained the result 130.77%, or 30.77% increase, and further that by a method given hereinafter we should obtain 109.53.

The illustration shews conclusively that the *weight* assigned to each is of great importance, but before dealing with this it is necessary to consider how several means can arise in determining price-indexes by means of price-ratios.

3. **Significance of Arithmetic, Geometric, and Harmonic Means of Price-Ratios.**—That there may be different *means* has already been referred to. A word is necessary as to their nature. When an increment to any quantity is uniform and independent of the magnitude of the quantity itself, that is, when it is dependent merely upon the interval of time elapsing, and is equal for equal times, then the progression is *arithmetic*. This is expressed by the following, viz. :—

$$(6) \ldots\ldots (a);\quad a + \frac{b-a}{2} = \left(\frac{a+b}{2}\right);\quad \frac{a+b}{2} + \frac{b-a}{2} = (b);$$

the common difference being $\frac{1}{2}(b-a)$, and the quantity $\frac{1}{2}(a+b)$ being the arithmetic mean of $a$ and $b$. Often, however, in the nature of the case the magnitude of the increase is actually *dependent* on the magnitude of the quantity to which it is added; for example, compound interest on money, that is, the *rate of increase*, is constant : then the progression is geometric, for example :—

$$(7) \ldots\ldots (a);\ a \times \sqrt{\frac{b}{a}} = (\sqrt{ab});\quad \sqrt{ab} \times \sqrt{\frac{b}{a}} = (b),$$

the common ratio being $\sqrt{(b/a)}$ and $\sqrt{(ab)}$ denoting the geometric mean of $a$ and $b$. We thus see that the square-root of the product of $a$ and $b$ is the mean value, when $a$ increases to $b$ *at a constant rate* on the increasing quantity. There is another important way in which a quantity can grow. Suppose $a$, in the fraction $\frac{1}{a}$, increases (or diminishes) to $b$, in the fraction $\frac{1}{b}$, *independently* of the magnitude of $a$ (or of $b$) Then we have :—

$$(8) \ldots\ldots \left(\frac{1}{b}\right);\ \frac{1}{b - \frac{b-a}{2}} = \left(\frac{1}{\frac{1}{2}[a+b]}\right);\ \frac{1}{b - 2\left(\frac{b-a}{2}\right)} = \left(\frac{1}{a}\right)$$

Multiply these by $ab$ and we get :—

$$(9) \ldots\ldots (a);\quad \left(\frac{2ab}{a+b}\right);\ \text{and } (b)$$

Then either series of the quantities in the brackets in (8) or (9) are in harmonic progression, formula (8) giving the form in which the progression arises in question of change in price-ratios, formula (9) that which is usually given as the harmonic mean between $a$ and $b$.

4. **The Harmonic Mean is really as legitimate as the Arithmetic, but is not more so, and both are invalid.**—The question of the legitimacy of employing either the arithmetic or the harmonic or the geometric method of arriving at a price-index may readily be illustrated by means of examples. It may be premised that if, at the beginning of a period of time, the price-index be taken as unity, and at the end of the period it is found by any process to be, say $I$, then, starting at the end of the period with a price-index of unity, and working back by the same process, one should arrive at $1/I$ as the price-index at the beginning. In other words, to have any definite meaning *the ratio between the two index-numbers should always be maintained if the scheme of calculation be arithmetically valid.* With this principle as a crucial test, the question arises which, if any, of the three methods of arriving at price-indexes will satisfy the test. Taking the same example as before, where three commodities, whose starting price is unity, changed in price until they stood respectively at 1.20 : 1.60 : and .6667 or $\frac{6}{5}$, $\frac{8}{5}$, and $\frac{2}{3}$ we have—

$$\text{Arithmetic Mean} = \frac{1}{3}\left(\frac{6}{5}+\frac{8}{5}+\frac{2}{3}\right) = 1.1556.$$

$$\text{Geometric Mean} = \sqrt[3]{\left\{\frac{6}{5}\cdot\frac{8}{5}\cdot\frac{2}{3}\right\}} = 1.0858.$$

$$\text{Harmonic Mean} = \frac{3}{\frac{5}{6}+\frac{5}{8}+\frac{3}{2}} = 1.0141.$$

Consequently the new index-numbers are respectively 1.1556, 1.0858, and 1.0141. The reciprocals of these numbers are respectively 0.8654, 0.9210, and 0.9861. Consequently if the process of obtaining the index-numbers be reversed, and we start at the end of the period, assuming that the corresponding index-number is unity, and then work back to the beginning by the three processes, we ought to find that the arithmetic gives 0.8654 as the price-index at the start, the harmonic process ought to give 0.9861, and the geometric ought to give 0.9210. We will see now what actually *does* happen. Our three price-ratios become $\frac{5}{6}$, $\frac{5}{8}$ and $\frac{3}{2}$.

$$\text{Arithmetic Mean} \quad \frac{1}{3}\left(\frac{5}{6}+\frac{5}{8}+\frac{3}{2}\right) = 0.9861, \text{ instead of } 0.8654.$$

$$\text{Geometric Mean} \quad \sqrt[3]{\left\{\frac{5}{6}\cdot\frac{5}{8}\cdot\frac{3}{2}\right\}} = 0.9210, \text{ as before } 0.9210.$$

$$\text{Harmonic Mean} = \frac{3}{\frac{6}{5}+\frac{8}{5}+\frac{2}{3}} = 0.8654, \text{ instead of } 0.9861.$$

We thus see that the arithmetic process gives the result expected from the harmonic process, and the harmonic, the result expected from the arithmetic; but the geometric process gives the result expected from that process. That is, neither the arithmetic nor the harmonic process is reversible, and *this is a grave defect, in fact a fatal one, as regards their practical use.* The geometric process alone satisfies the indicated test of consistency.

5. **Weights to be applied when Price-ratios are used.**—Attention may now be given to the important question of *weighting,* if price-ratios are used. It is obvious that relative units of quantities used in the same period must be employed with the method of expenditures; formula (2). Reverting to the original illustration, we may further consider the case of the three commodities whose prices, starting at

unity at date 0, become respectively 1.20 : 1.60 : and 0.6667 at date 1. We shall denote the *weights* by $u$, $v$, $w$, etc.; they measure relatively the *expenditure* on the corresponding commodities. Three courses may be adopted.

(i.) The price-ratios can be weighted according to the respective expenditures at date 0.*

(ii.) The price-ratios can be weighted according to respective expenditures at date 1.*

(iii.) The price-ratios can be weighted according to some *mean* of the two expenditures. Of these mean-weights, there are only three which it is at present proposed to consider, viz., those already referred to (*a*) the arithmetic, (*b*) the geometric, and (*c*) the harmonic.*

These deduced mean-weights (iii*a*), (iii.*b*) and (iii.*c*) can be computed by formula (3), (4), and (5) if we substitute $u$, $v$, and $w$ for $p$, $q$, and $r$ therein, and the different weights, computed in the way indicated, are shewn in the following table :—

| Method. | Expenditures as at— | Weights. | | |
|---|---|---|---|---|
| | | $u$ | $v$ | $w$ |
| (i.) | Date 0 .. .. .. .. .. | 50 | 15 | 30 |
| (ii.) | Date 1 .. .. .. .. .. | 60 | 24 | 20 |
| (iii.*a*) | Arithmetic mean, dates 0 and 1 .. .. | 55 | 19.5 | 25 |
| (iii.*b*) | Geometric mean, dates 0 and 1 .. .. | 54.77 | 18.97 | 24.49 |
| (iii.*c*) | Harmonic mean, dates 0 and 1 .. .. | 54.55 | 18.46 | 24 |

The respective index-numbers, computed as by formula (10) hereinafter, viz., that which is most commonly used, are given by the amounts

$$\frac{(50 \times 1.20) + (15 \times 1.60) + (30 \times 0.6667)}{50 + 15 + 30},$$

and four other similar expressions. Their values multiplied by 100 are :

Index according to—

(i.) = 109.47† ; (iii.*a*) = 114.44 ; (iii.*c*) = 114.41.

(ii.) = 118.97 ; (iii.*b*) = 114.43 ;

The last three results, though worthless, are almost identical, but (iii.*b*) and (iii.*c*) would, of course, not be employed with formulæ (3) or (10) hereafter. Given the weights to be adopted, we may now consider the question how the price-index should be computed if price-ratios are used at all. We may remark that a "weighted mean" is the mean that would be obtained by regarding each item as repeated the number of times indicated by the weight number.

Let the weights corresponding to commodities A, B, and C (or to the price-ratios $p$, $q$, and $r$) be denoted by $u$, $v$, and $w$.

Then instead of formulae (3), (4) and (5), we have, using $J$ (instead of $I$) to denote a *weighted-mean*, the following formulae, according to whether we employ the arithmetic, geometric, or harmonic mean :

$$(10) \ldots\ldots J' = \frac{1}{(u + v + w + \text{etc.})}(up + vq + wr + \text{etc.})$$

$$(11) \ldots\ldots J'' = \left\{ p^u \,.\, q^v \,.\, r^w \,.\, \text{etc.} \right\}^{\frac{1}{u + v + w + \text{etc.}}}$$

$$(12) \ldots\ldots J''' = \frac{u + v + w + \text{etc.}}{\frac{u}{p} + \frac{v}{q} + \frac{w}{r} + \text{etc.}}$$

* It is of course evident that if this can be done it is also possible to work with the relative units used of the various commodities; thus formula (2) is more *convenient*. It is also to be preferred in every way as will hereafter be shewn.

† As given by formula (2) since the units are identical.

By taking logarithms of (11) we see that we obtain a result *analogous* in form to (10) since

$$(11a) \ldots\ldots \ log.\ J'' = \frac{1}{u+v+w+\text{etc.}} \ (u \ log.\ p + v \ log.\ q + w \ log.\ r + \text{etc.})$$

We see thus, that using the weights indicated by (iii.$b$) according to formula (11), we have

$$log.\ J'' = \frac{1}{98.23} \left\{ 54.77 \times 0.07918 + 18.97 \times 0.20412 + 24.49 \times \bar{1}.82391 \right\}$$

thus $J'' = 1.0956$ ; and $100\ J'' = 109.56$.*
Lastly, using the weights indicated (iii.$c$) according to formula (12) we get

$$J''' = \frac{54.55+18.46+24}{\frac{54.55}{1.2}+\frac{18.46}{1.6}+\frac{24}{0.6667}} = \frac{97.01}{92.99} = 1.0432 \text{ ; and } 100\ J''' = 104.32.$$

From the examples given it will be noticed that when the price-index is computed as a geometric mean, it lies between values given by the harmonic and arithmetic means, the arithmetic being the highest. Incidentally, it may be remarked that it is obvious that the weighted geometric mean will be lower than the weighted arithmetic mean, since, with numbers greater than unity and very near unity, the difference between the logarithms of numbers is much less than the differences between the numbers themselves. Thus, as we see at once from formula (11$a$), the effect of large differences of weighting must necessarily be less when the geometric mean is computed, rather than the arithmetic. That on other grounds the geometric mean is also to be preferred can be seen instantly from the fact that it incidentally gives consistent results in whatever way we work from one date to another, whereas the arithmetic and harmonic means do *not* give consistent results. By parity of process differences of value may in general be appropriately measured by their relation to the quantity which fluctuates, and this conception of rate-variation necessarily leads to the adoption of geometric means : or to put it in other words, —the moment price-variation is looked at from the standpoint of rate-differences (for example, 1d. is 10% in the case of an article the value of which is 10d., but only 5% where the value of the article is 20d.) we see at once that all measurement of change of value may quite appropriately be in *rates*, and, consequently, the geometric mode of computing may be regarded as the legitimate one where the original data are supplied in the form of price-ratios. Finally, it may be noted that the weighted geometric mean, the weights being given by (iii.$b$), in conjunction with formula (11), is 109.56, by (iii.$a$) and formula (11) is 109.53, and by the cost-of-living formula, viz. (2), is 109.47† ; and further if the original weights 50, 15, and 30 for commodities A, B, and C be taken, and the weighted geometric mean of the price-ratios be calculated, we obtain 104.30 (practically identical with the harmonic result of formula (12) just given). This shews that it is by no means satisfactory to use the original weights, as is usually done in the case of price-indexes, *unless* there be reason to believe they are sensibly constant throughout.

6. **Computation of Mean Weights.**—We now reach the discussion of the general problem of which the example just given is a particular case. Suppose at date 0 the prices of a series of commodities are respectively $a_0, b_0, c_0$, etc. ; and an amount $\alpha_0$ is bought of the first, $\beta_0$ of the second, etc. ; the total expenditure on the first amounting to $\zeta_0$, on the second to $\eta_0$ , etc. Suppose further that at date 1 the respective prices are $a_1$, $b_1$, etc., the price-ratios $\frac{a_1}{a_0}$, etc., are denoted by $p, q, r$, etc., and the total expenditures by $\zeta_0, \eta_0$, etc., at date 0, and $\zeta_1, \eta_1$, etc., at date 1. Then weighting the different quantities by the geometric means of the expenditures according to the geometric formula, we have, since

$$\begin{array}{llll} (13) \ldots\ldots & \zeta_0 = \alpha_0 a_0 \ ; & \zeta_1 = \alpha_1 a_1 \ ; & \text{etc.} \\ (13a) \ldots\ldots & \eta_0 = \beta_0 b_0 \ ; & \eta_1 = \beta_1 b_1 \ ; & \text{etc.,} \\ & \text{etc.,} \quad \text{etc.,} & \text{etc.,} \quad \text{etc.,} & \text{etc.,} \end{array}$$

for index-number at date 1,

$$(14) \ldots\ldots \ J'' = \left( p^{\sqrt{\zeta_0\zeta_1}} \cdot q^{\sqrt{\eta_0\eta_1}} \cdot \text{etc.} \right)^{\frac{1}{\sqrt{\zeta_0\zeta_1}+\sqrt{\eta_0\eta_1}+\text{etc.}}}$$

* By formula (2), viz., the ratio of the aggregate expenditures, we get 109.47; using arithmetic-mean weights and formula (11) we get 109.53.]

† It is shewn hereinafter that formulæ (11) and (2) are sensibly identical when the weights and units are properly determined.

a number whose logarithm is

$$(15)\ldots\ldots log.\ J'' = \frac{\sqrt{\zeta_0\zeta_1}\ log.\ p + \sqrt{\eta_0\eta_1}\ log. q + \text{etc.}}{\sqrt{\zeta_0\zeta_1} + \sqrt{\eta_0\eta_1} + \text{etc.}}$$

Consequently when the total expenditures at any two periods are at all comparable, we may put with sufficient accuracy

$$(16)\ldots\ldots \zeta = \tfrac{1}{2}(\zeta_0 + \zeta_1);\ \text{and}\ \sqrt{\zeta_0\zeta_1} = \zeta - \tfrac{1}{8}\frac{(\zeta_1 - \zeta_0)^2}{\zeta} + \text{etc.}$$

The term $-\frac{1}{8}(\zeta_1 - \zeta_0)^2 / \zeta$ is so small as ordinarily to be negligible in nearly all practical cases, since if the expenditure were double and triple we shall have only the following percentage of error in (16), viz.,

$$\zeta_0 : \zeta_1 = 1 : 2;\ \text{error} = 5.72\%;\ \text{if} = 1 : 3;\ \text{error} = 13.40\%.$$

It is evident that, since in formula (11 ) this error of weight enters into both the numerator and denominator, its effect must be greatly reduced, and it will lead only to a very small relative error indeed. In other words, in (11) we may always take

$$(17)\ \ldots\ldots\ u = \tfrac{1}{2}(u_0 + u_1);\ v = \tfrac{1}{2}(v_0 + v_1);\ \text{etc.}$$

Thus in the expression for the logarithm of the index-number, viz.,

$$(\sqrt{\zeta_0\zeta_1}\ log.\ p + \sqrt{\eta_0\eta_1}\ log.\ q + \text{etc.}) / (\sqrt{\zeta_0\zeta_1} + \sqrt{\eta_0\eta_1} + \text{etc.})$$

no considerable error will be introduced by using arithmetic instead of geometric means, and the computation will be simpler. In order to illustrate this, we may revert to the former example, and consider two commodities whose price-ratios are, as before, 1.2 and 1.6 at the end of some period as compared with the beginning. Let us further take the extreme case where the expenditure on the first commodity is trebled, and that on the second commodity doubled, since this will severely test the validity of the assumption. Thus $\zeta_0 = 50$; $\zeta_1 = 150$; $\eta_0 = 15$; $\eta_1 = 30$; *log.* $p = 0.07918$; *log.* $q = 0.20412$; then the two values for the logarithm of the index-number become :—

For *log.* of geometric mean :—

$$\frac{50\sqrt{3}\ log.\ 1.2 + 15\sqrt{2}\ log.\ 1.6}{50\sqrt{3} + 15\sqrt{2}} = \frac{86.602\ log.\ 1.2 + 21.213\ log.\ 1.6}{107.815} = 0.10376$$

For log of arithmetic mean :—

$$\frac{100\ log.\ 1.2 + 22.5\ log.\ 1.6}{122.5} = 0.10213$$

These logarithms correspond to index-numbers, which multiplied by 100, as is usual, are 126.99 and 126.51 respectively, the two results being therefore sensibly identical.

7. **Error of Arithmetic Means.**—It is worth while to investigate, on the lines of the last example, the amount of error introduced into the logarithm of the price-index by taking arithmetic instead of geometric means of expenditure.

Suppose, as before, there are two commodities whose price-ratios at date 1 are $p$ and $q$ as compared with unity at date 0. Suppose that the expenditures at date 1 are respectively $k^2$ and $l^2$ times expenditure at date 0.

By taking *arithmetic means* the logarithm of the price-index at date 1 becomes :—

$$log.\ J = \frac{(1 + k^2)\ log.\ p + (1 + l^2)\ log.\ q}{(1 + k^2) + (1 + l^2)}$$

By taking *geometric means*, the logarithm of the price-index at date 1 becomes :—

$$log\ J'' = \frac{k\ log.\ p + l\ log.\ q}{k + l}$$

If $E$ denote the error introduced by taking arithmetic means,

$$(18)\ \ldots\ldots\ E = \frac{k\ log.\ p + l\ log.\ q}{k + l} - \frac{(1 + k^2)\ log.\ p + (1 + l^2)\ log.\ q}{(1 + k^2) + (1 + l^2)}$$

$$= (log.\ q - log.\ p)\ .\ \frac{k - l}{k + l}\ .\ \frac{kl - 1}{k^2 + l^2 + 2}$$

Now we have the inequality

$$(l^2 + k^2) > 2kl;\ \text{consequently}\ (k^2 + l^2 + 2) > 2kl + 2$$

and therefore

$$(19)\ \ldots\ldots\ E < \frac{(log.\ q - log.\ p)}{2}\ .\ \frac{k - l}{k + l}\ .\ \frac{kl - 1}{kl + 1}$$

This presupposes, of course, that the initial expenditure on each commodity at date 0 was unity.

If the initial expenditures on each commodity, instead of being unity, were respectively $e$ and $f$, then the expenditures at date 1 would be $ek^2$ and $fl^2$. In this case we have

$$(20) \; \ldots\ldots \; E = (log.\, q - log.\, p) \; . \; \frac{ef\,(k-l)\;(kl-1)}{(ek+fl)\,(ek^2+fl^2+e+f)}$$

In this case the inequality becomes $(ek^2+fl^2) > 2\sqrt{ef}\,.\,kl$; and $(e+f) > 2\sqrt{ef}$;

$$\text{consequently } (ek^2+fl^2+e+f) > 2\sqrt{ef}\;(kl+1).$$

Also it can be shewn algebraically that if $(ek^2-fl^2)$ and $(e-f)$ are of the same sign, as is most frequently the case, then

$$(ek+fl) > \sqrt{ef}\,(k+l)$$

for $(ek^2 - fl^2)\;(e-f) > 0$; consequently $(e^2k^2+f^2l^2) > ef\,(l^2+k^2)$ and $(e^2k^2+f^2l^2+2efkl) > ef\,(k^2+l^2+2kl)$; and therefore

$$(ek+fl) > \sqrt{ef}\,(k+l).$$

From this analysis it is evident on reverting to (20) that

$$E < \frac{log.\, q - log.\, p}{2} \; . \; \frac{k-l}{k+l} \; . \; \frac{kl-1}{kl+1}$$

as in the former case; see (19).

A superior limit has thus been found for the error in the logarithm of the price-index. As in practical examples $k$ and $l$ are ordinarily nearly equal, the error is thus very small, since $k-l$ will then nearly vanish. A considerable list, viz., of about 50 commodities shews that the error is by no means inconsiderable even when the number of commodities is large.

8. **Index-Numbers referred to Average Conditions during a Period.**—We have already shewn that the best weight to be adopted in deducing the price-indexes of any two dates is in proportion to the mean of the expenditures, and that no sensible error is involved in taking the arithmetic mean, if the computation as between the price-ratios be made on the principle of the geometric mean. But the comparison of the highest value is clearly that based on the average expenditure of a longer period, since the variations of this are less marked, being free from what may be called "large accidental departures from the mean." Hence it is preferable to employ a quinquennium or decennium as basic period. And since it has been established that, for a period covering two dates, the exact nature of the determination of the mean is the weighting to be adopted (*i.e.*, whether geometric, arithmetic, etc.) is not of high importance, we may get results of a very high order of accuracy in a simple manner. Thus although a strict adherence to theory demands that the logarithms of the price-ratios should be weighted by the geometric means of the two expenditures, still a result identical for all practical purposes can be obtained by using the arithmetic means, and because of the considerable saving in computation secured by using the arithmetic mean of the weights, it is to be preferred. By similar reasoning, the proposition established can be extended to meet the case of a large number of years, instead of only two, and the conclusion is thus reached that if $\zeta_0, \zeta_1, .. \zeta_{m-1}$, are the expenditures at $m$ observed periods, the general weighting may be found by taking the arithmetic mean $\frac{1}{m}\{\zeta_0 + \zeta_1 + \ldots . \zeta_{m-1}\}$, instead of the theoretically-more-accurate geometric mean $(\zeta_0\;\zeta_1 \ldots . \zeta_{m-1})^{\frac{1}{m}}$. This is really equivalent to *asserting that the basis* of the comparison of the purchasing-power of money may be the arithmetic average of the expenditure on the various commodities throughout the period under examination.

9. **Differences between various Price-Indexes.**—Price-indexes may be said, in general, to purport to represent the relative amount of money that must *on the average* be paid for commodities at successive dates, the value paid on the original date being taken as 100. Price-ratios are similar to the index-numbers, or price-indexes, but apply only to individual commodities or limited groups of commodities. Since the purchasing power of *gold* in regard to a particular commodity is an individual measure of its exchange-value (*i.e.*, of the exchange-relation between the two) it has been commonly imagined that by taking a sufficient number of commodities a general measure of all changes in the purchasing-power of gold can be

determined. In other words, it is supposed that the price-indexes represent the quantity of gold corresponding to 100 units thereof (£) at the initial date, viz., that corresponding to the 100. An examination of the various tables of price-indexes shews that attempts to measure this general relation are very unsatisfactory. To illustrate this the tables hereunder are given. They furnish the price-indexes established by various authorities by computation from various series of commodities, and it is indicated in the tables on what the estimate is based. It will be seen that there are marked divergences between individual results, so great indeed as to indicate that their value is very limited. For one example one series of indexes represents rises, while for the same period another will represent falls. The fact is this, viz., that price-indexes are definite only for a definite regimen, that is for a series of commodities used in given quantities ; and the hope to obtain a general price-index which will represent in its totality the variation in the general exchange-value of gold is to expect the impossible.

No doubt for each country a series of commodities and system of weights might be taken as representing the average usage of the *entire population* in regard to these commodities. Other series of commodities and systems of weights would represent the usage of the *different classes* in the community. Both would differ as between nation and nation; consequently if any international standard is to be developed for the widest system of comparisons, the series should be common to all, and the weights should represent the average usage of the nations included. For international comparisons of classes a similar standard-series and average-weights would be required. This has been dealt with elsewhere by me. It will suffice here to observe that a system rendering general international comparisons possible, and also international comparison of classes, would have to be established by an international practice. This could be reached only by an international commission on the subject.

The following tables give the price-indexes furnished by various authorities. They disclose the fact that they are of little value to determine quantitatively small differences of the purchasing efficiency of money, the fact being that such indexes are not sufficiently well-determined to answer many social-economic questions that are arising, for example, an automatic variation of wage-determinations, which has been suggested in this country (Australia). The tables enable one to obtain an idea also of the *range of uncertainty* as among the methods adopted by different authorities.

TABLE I.—VARIOUS PRICE INDEXES, 1900-1910.
REDUCED TO 1900 VALUES AS BASIS.

| Year. | A. 22 Com. | B. 45 Com. | C. | D. 37 Com. | E. | F. | G. 257 Com. | 230 Com. H. Weighted.* | 230 Com. I. Unweight'd. |
|---|---|---|---|---|---|---|---|---|---|
| 1900 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1901 | 99.5 | 96.9 | 101.9 | 93.5 | 96.9 | 95.2 | 98.2 | 100.2 | 98.9 |
| 1902 | 91.3 | 96.5 | 101.6 | 92.6 | 95.8 | 90.8 | 102.2 | 103.6 | 100.7 |
| 1903 | 93.3 | 96.9 | 103.2 | 92.6 | 94.2 | 90.7 | 102.8 | 103.7 | 102.1 |
| 1904 | 102.6 | 98.3 | 104.3 | 93.6 | 97.8 | 91.8 | 102.3 | 104.5 | 103.0 |
| 1905 | 99.5 | 97.6 | 103.7 | 96.5 | 98.5 | 91.7 | 104.9 | 107.6 | 105.3 |
| 1906 | 108.7 | 100.5 | 103.2 | 102.7 | 103.3 | 97.0 | 110.9 | 113.5 | 110.9 |
| 1907 | 116.9 | 105.7 | 105.8 | 106.2 | 107.7 | 101.9 | 116.3 | 122.1 | 116.6 |
| 1908 | 107.7 | 102.8 | 108.4 | 97.5 | 103.3 | 97.9 | 111.1 | 118.2 | 111.6 |
| 1909 | 102.6 | | 108.2 | 99.0 | 105.6 | 94.0 | 114.5 | 119.4 | 112.0 |
| 1910 | 111.8 | — | 109.9 | 103.8 | — | — | 119.1 | — | — |

* Weighted according to table of the British Association for the Advancement of Science, 1887 to 1890

A. The Economist (Old Basis); Wholesale Prices Index Number, 1st January of each Year ; 22 Commodities.
B. Board of Trade. Wholesale Prices in United Kingdom ; 45 Commodities.
C. Board of Trade. Retail Prices in London.
D. Sauerbeck. Average Prices in England. 37 Commodities.
E. United Kingdom. From Parliamentary Paper Cd. 4867. Imports.
F. United Kingdom. From Parliamentary Paper Cd. 4867. Exports.
G. United States. Wholesale Prices ; 257 Commodities.
H. Canada. Wholesale Prices ; 230 Commodities. Weighted.
I. Canada. Wholesale Prices ; 230 Commodities. Unweighted.

TABLE II.—VARIOUS PRICE INDEXES, 1871-80. REDUCED TO 1871 AS BASIS.

| Year. | M. 22 Com. | N. 45 Com. | O. 39 Com. | P. 22 Com. | Q. 114 Com. | R. 50 Com. | S. 223 Com. | T. 223 Com. | U. 223 Com. | V. 223 Com. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1871 .. | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1872 .. | 109.5 | 107.2 | 109 | 106.6 | 106.8 | 105.4 | 102.1 | 97.9 | 97.3 | 103.5 |
| 1873 .. | 113.8 | 112.3 | 111 | 106.1 | 108.9 | 110 | 101.1 | 96.1 | 94.8 | 99.3 |
| 1874 .. | 111.6 | 108.9 | 102 | 97.4 | 107.2 | 104.5 | 97.8 | 96.6 | 95.5 | 97.1 |
| 1875 .. | 107.3 | 103.4 | 96 | 98.2 | 102.2 | 99.1 | 93.8 | 96.0 | 94.7 | 92.1 |
| 1876 .. | 104.7 | 101.5 | 95 | 96.2 | 101.0 | 92.7 | 86.9 | 92.6 | 90.1 | 95.3 |
| 1877 .. | 104.8 | 104.1 | 94 | 98.2 | 100.5 | 93.6 | 81.5 | 87.7 | 83.5 | 84.9 |
| 1878 .. | 98.6 | 97.5 | 87 | 85.4 | 94.9 | 87.3 | 74.5 | 82.6 | 76.9 | 81.3 |
| 1879 .. | 85.9 | 93.1 | 83 | 83.1 | 92.2 | 83.6 | 71.0 | 77.4 | 69.8 | — |
| 1880 .. | 99.5 | 95.3 | 88 | 85.0 | 96.0 | 87.3 | 78.6 | 82.9 | 77.1 | — |

M. The Economist (Old Basis); Wholesale Prices; 22 Commodities.
N. Board of Trade. Wholesale Prices in United Kingdom; 45 Commodities.
O. Sauerbeck. Average Prices in England; 39 Commodities.
P. Palgrave's French Prices; 22 Commodities.
Q. Soetbeer's Hamburg Prices; 114 Commodities.
R. Mulhall. "Ratio of Values"; 50 Commodities.
S. Aldrich Report; 223 Commodities—Commodities Unweighted.
T. ,, ,, ,, ,, Commodities Weighted according to Uniform Expenditure.
U. ,, ,, ,, ,, Commodities Weighted according to 68.6% of Total Expenditure.
V. ,, ,, ,, ,, Gold Index Numbers. All commodities averaged simply.

Reverting to Table I., it is obvious that weighting is not a matter of indifference even with a large number of commodities: see columns H and I, years 1900 and 1901, for example. Further, it is evident that the effect of ignoring weighting may be relatively large: see for example the year 1909 in the same columns, giving 119.4 for the weighted, and 112.0 for the unweighted results. It is clear from the same table (see columns A, B, C, D, for example, year 1904) that the indications of tables as now prepared are of relatively small value for deducing reliable estimates.

A comparison of the results on Table II. leads to the same conclusion, viz., that the divergences between different estimates of a price-index are so great as to indicate that at present they are of very limited value.

It will be appropriate to indicate the nature and defects of various methods of computing a price-index. In this connection it may be remarked that if I, J, K, etc., are price-indexes for any series of dates, then the scheme of computation should be such that the ratios I/J, I/K, J/K, shall remain unchanged in whatever order the results are obtained.

Some remarks are added later concerning a supposed demonstration that the geometric mean is unsatisfactory.

10. **Various Methods adopted for measuring the Exchange-Value of Money.**—The following are various methods which have been employed for determining the variations in the exchange-value of money. The essential features of each method are given in terms of the notation employed hereinbefore. The notation used is that of § 2, and the products $\alpha a$, $\beta b$, etc., therefore measure the money-value-importance of the different commodities at times shewn by the suffix employed. They are denoted by $\zeta_0$, $\eta_0$, etc., $\zeta_1$, $\eta_1$, etc., according to the dates. See formulæ (13) and (13*a*).

(i.) **Dutot's Method.**—In this method the prices of commodities are taken at their market quotations, and the mass-units are assumed to be equal. Then if $P_1$ and $P_0$ are the price-indexes at dates 1 and 0,

$$(21) \; \ldots\ldots \quad \frac{P_1}{P_0} = \frac{a_1 + b_1 + \text{etc.}}{a_0 + b_0 + \text{etc.}} = \frac{a_0 \cdot {}_0p_1 + b_0 \cdot {}_0q_1 + \text{etc.}}{a_0 + b_0 + \text{etc.}}$$

This method consequently weights the price-ratios with the numbers $a_0$, $b_0$, etc., viz., the prices at date 0. The method is probably now rarely used.

(ii.) **Carli's Method.**—This method consists simply in taking the arithmetic mean of the different price-ratios and is expressed algebraically as follows :—

$$(22) \ldots\ldots \quad \frac{P_1}{P_0} = \frac{1}{n}\left(\frac{a_1}{a_0} + \frac{b_1}{b_0} + \text{etc.}\right) = \frac{1}{n}\left({}_0p_1 + {}_0q_1 + \text{etc.}\right)$$

(iii.). **Evelyn's Variation of Carli's Method.**—In Evelyn's variation several periods are compared with the first, all the prices of which are taken as 100. Suppose that we have

$$\frac{P_1}{P_0} = \frac{1}{n}\left(\frac{a_1}{a_0} + \frac{b_1}{b_0} + \text{etc.}\right); \quad \frac{P_2}{P_0} = \frac{1}{n}\left(\frac{a_2}{a_0} + \frac{b_2}{b_0} + \text{etc.}\right);$$

then it follows that—

$$(23) \quad \frac{P_2}{P_1} = \frac{\dfrac{a_2}{a_0} + \dfrac{b_2}{b_0} + \text{etc.}}{\dfrac{a_1}{a_0} + \dfrac{b_1}{b_0} + \text{etc.}} = \frac{\dfrac{a_1}{a_0} \cdot \dfrac{a_2}{a_1} + \dfrac{b_1}{b_0} \cdot \dfrac{b_2}{b_1} + \text{etc.}}{\dfrac{a_1}{a_0} + \dfrac{b_1}{b_0} + \text{etc.}}$$

Consequently the expressions $\dfrac{a_2}{a_1}$, $\dfrac{b_2}{b_1}$ instead of being weighted evenly (the essential feature of Carli's method) are weighted according to the numbers $a_1/a_0$, $b_1/b_0$, etc., *i.e.*, according to the price-ratios between 1 and 0. This points to an inconsistency in Carli's method, which is repeated in Young's method, to which reference will now be made.

(iv.) **Young's Method.**—In this method prices at the first period are taken as unity, and at the second period as $a'_1$, $b'_1$, etc. These last values are weighted according to the relative total-exchange-values of the classes in general use (at some period), and the sum of the products divided by the sum of the weights. Algebraically it is expressed thus :—

$$(24) \ldots\ldots \quad \frac{P_1}{P_0} = \frac{\zeta a'_1 + \eta b'_1 + \text{etc.}}{\zeta + \eta + \text{etc.}}$$

$a'_1$ denoting the value of $\dfrac{a_1}{a_0}$ when $a_0$ is taken as unity.

Young's method, however, has the same inconsistency as Carli's, for

$$\frac{P_2}{P_0} = \frac{\zeta a'_2 + \eta b'_2 + \text{etc.}}{\zeta + \eta + \text{etc.}}; \text{ consequently}$$

$$(25) \ldots\ldots \quad \frac{P_2}{P_1} = \frac{\zeta a'_2 + \eta b'_2 + \text{etc.}}{\zeta a'_1 + \eta b'_1 + \text{etc.}} = \frac{\zeta a'_1 \cdot \dfrac{a_2}{a_1} + \eta b'_1 \cdot \dfrac{b_2}{b_1} + \text{etc.}}{\zeta a'_1 + \eta b'_1 + \text{etc.}}$$

In other words, the weighting is now $\zeta a'_1$, $\eta b'_1$, instead of $\zeta$, $\eta$, etc.

(v.) **Scrope's Method.**—The essential feature of Scrope's method is that the same mass-units are employed at different periods. Algebraically it may be written as follows :—

$$(26) \ldots\ldots \quad \frac{P_1}{P_0} = \frac{\alpha a_1 + \beta b_1 + \text{etc.}}{\alpha a_0 + \beta b_0 + \text{etc.}}$$

that is to say, it is what has been called in § 2 herein, the "cost-of-living" formula (2). This is equivalent to the following :—

$$(26a) \ldots\ldots \quad \frac{P_1}{P_0} = \frac{\alpha a_0 \cdot \dfrac{a_1}{a_0} + \beta b_0 \cdot \dfrac{b_1}{b_0} + \text{etc.}}{\alpha a_0 + \beta b_0 + \text{etc.}}$$

This latter formula shews that the price-ratios are weighted by the multipliers $\alpha a_0$, $\beta b_0$, etc., which would represent the original expenditures if $\alpha$, $\beta$, etc., were the original quantities or mass-units, or the *average expenditures* if $\alpha$, $\beta$, etc., are suitably taken. Thus it resembles Young's method in form. We shall shew later that it is really the best form.

(vi.) **Laspeyres' and Paasche's Variation of Scrope's Methods and Scrope's "Emended Variation."**—It may be remarked that the question of the exact mass-quantities to be used has not yet been touched. Three methods are possible :—

(*a*) By using the mass-quantities of the initial period—

$$(26b) \;\ldots\ldots\; \frac{P_1}{P_0} = \frac{\alpha_0 a_1 + \beta_0 b_1 + \text{etc.}}{\alpha_0 a_0 + \beta_0 b_0 + \text{etc.}} \quad \text{(Laspeyres' variation);}$$

(*b*) By using mass-quantities of the final period ;

$$(26c) \;\ldots\ldots\; \frac{P_1}{P_0} = \frac{\alpha_1 a_1 + \beta_1 b_1 + \text{etc.}}{\alpha_1 a_0 + \beta_1 b_0 + \text{etc.}} \quad \text{(Paasche's variation);}$$

(*c*) By using some mean between the two. The best known is the geometric mean, viz.,

$$(26d) \;\ldots\ldots\; \frac{P_1}{P_0} = \frac{\sqrt{\alpha_0 \alpha_1}.a_1 + \sqrt{\beta_0 \beta_1}.b_1 + \text{etc.}}{\sqrt{\alpha_0 \alpha_1}.a_0 + \sqrt{\beta_0 \beta_1}.b_0 + \text{etc.}}$$

which is known as Scrope's "*emended variation,*" see formulæ (13) (13*a*) and (14) hereinbefore, where it has already been shewn that the more convenient arithmetic mean of $\alpha_0$ and $\alpha_1$, etc., is sufficiently accurate.

(vii.) **Drobisch's Method.**—This method is the best known example of the methods depending on double-weighting. Drobisch took his prices to be prices of the same *aggregated mass-unit*, that is a unit consisting of all the commodities in the relative quantities as used. His method assumes that the average price of an aggregated mass-unit will be as follows, viz. :—

$$\frac{\alpha_0 a_0 + \beta_0 b_0 + \text{etc.}}{\alpha_0 + \beta_0 + \text{etc.}}, \text{ at the first period ; and}$$

$$\frac{\alpha_1 a_1 + \beta_1 b_1 + \text{etc.}}{\alpha_1 + \beta_1 + \text{etc.}}, \text{ at the second period ;}$$

and so on. From this we have directly

$$(27) \;\ldots\ldots\; \frac{P_1}{P_0} \quad \frac{\dfrac{\alpha_1 a_1 + \beta_1 b_1 + \text{etc.}}{\alpha_1 + \beta_1 + \text{etc.}}}{\dfrac{\alpha_0 a_0 + \beta_0 b_0 + \text{etc.}}{\alpha_0 + \beta_0 + \text{etc.}}}$$

This equation is equal to—

$$(27a) \;\ldots\ldots\; \frac{P_1}{P_0} \quad \frac{\alpha_1 a_1 + \beta_1 b_1 + \text{etc.}}{\alpha_0 a_0 + \beta_0 b_0 + \text{etc.}} \cdot \frac{\alpha_0 + \beta_0 + \text{etc.}}{\alpha_1 + \beta_1 + \text{etc.}}$$

It is obviously a fallacy to suppose that differently constituted "aggregated-mass-units" can be compared in this way : see remarks in the next sub-section.

(viii.) **Lehr's Method.**—Lehr's method, as Drobisch's, also employs double-weighting, but differs from Drobisch in the second factor on the right hand side of (27*a*). Algebraically it may be written—

$$(28) \;\ldots\ldots\; \frac{P_1}{P_0} = \frac{\alpha_1 a_1 + {}_1\beta b_1 + \text{etc.}}{\alpha_0 a_0 + \beta_0 b_0 + \text{etc.}} \cdot \frac{\alpha_0\left(\dfrac{\alpha_0 a_0 + \alpha_1 a_1}{\alpha_0 + \alpha_1}\right) + \beta_0\left(\dfrac{\beta_0 b_0 + \beta_1 b_1}{\beta_0 + \beta_1}\right) + \text{etc.}}{\alpha_1\left(\dfrac{\alpha_0 a_0 + \alpha_1 a_1}{\alpha_0 + a_1}\right) + \beta_0\left(\dfrac{\beta_0 b_0 + \beta_1 b_1}{\beta_0 + \beta_1}\right) + \text{etc.}}$$

Lehr's method uses the arithmetic average, firstly with double-weighting, secondly on the mass-units that have the same average price over both the periods compared. It is also unsatisfactory, the objection to the methods of both Drobisch and Lehr being that were an equality of prices at two periods accompanied by a large difference (increase) in mass-quantities, it would lead to a difference (increase) in the price-index. That is to say, *though the price of every commodity might remain the same, the formulae both of Drobisch and Lehr would furnish different price-indexes.*

11. **Erroneously Alleged Defects in the Geometric Mean.**—Laspeyres (a professor in the University of Basle) urged that the geometric mean, suggested by Jevons, was defective, supporting his contention by the following argument :—He supposes that from date 0 to date 1 the price of commodity A advanced from 1 to 2,

and commodity B declined from 1 to $\frac{1}{2}$. Since to purchase a unit of each commodity, 2 money-units would have been required initially, and at the second date $2\frac{1}{2}$ money-units, he argues that the prices have advanced from 2 to $2\frac{1}{2}$, that is 25%. This, of course, is what is given by formula (2) herein, which *limits the consideration to the case where the mass units purchased are constantly the same.* In this case there can be no doubt as to which is the correct formula, in other words, the second aggregate of expenditure over the first aggregate is the only correct mode of computing the ratio of advance. But if, on the other hand, the general case is to be considered, where the degree of usage of each commodity may possibly have changed between the two periods, we cannot then assume that the mass-units are to be regarded as equal. The weights for price-ratios are *expenditures*, and in the case supposed by Laspeyres they are not equal. In this instance the "weights" at date 0 are the same for commodity A and B, but at date 2 the "weights" have materially changed. If we take the "weighting" into account, then the geometric mean of the weights will give results very approximate to those which Laspeyres claims should be given, and yet the case is not quite so limited as his was. The illustration confirms the view that in the general case, the geometric mean gives undoubtedly the better result, and Laspeyres' case does not really dispose of Jevons' argument: all it shews is that when price-ratios are used, proper weighting is no less important than in any other case, contrary to popular economic opinion. Thus by formula (2) we have the price-index 125 (Laspeyres' alleged correct value). But using geometric mean weights we get—

| Commodity. | Date 0. | Date 1. | Price Ratio. | Weights. |
|---|---|---|---|---|
| A | 1 | 2 | ${}_0p_1 = 2$ | $u_0 = 1;\ u_1 = 2$ |
| B | 1 | $\frac{1}{2}$ | ${}_0q_1 = \frac{1}{2}$ | $v_0 = 1;\ v_1 = \frac{1}{2}$ |

Hence the result by the geometric mean, with geometric mean weights=125.99.

We see from this that Laspeyres' argument fails wholly, if as was originally pointed out, it is remembered that comparisons are invalid which take no account of those variations in the relative importance of commodities, which may be described as *changes in the standard of expenditure*, similar for example to changes in the standard of living or regimen. In other words, Laspeyres' contention that the geometric mean by Jevons' method gives *no change of price-index*, is merely a consequence of an inappropriate method of deducing a price-index, and confirms the view hereinbefore expressed, that exact "weights" must be used, if the deduced price-indexes are to have any economic value. Jevons' own suggestion, that perhaps the harmonic mean may be taken, is in general invalid, for reasons already indicated.

12. **The Aggregate-Expenditure Method, the Best.**—In § 10, Scrope's method, Laspeyres' and Paasche's variations of this method, and Scrope's own "emended variation" have already been referred to. Scrope used the same mass-units at different periods, *i.e.*, he assumed a *constant regimen.* Laspeyres' variation, also based upon a constant regimen, was that he used the mass-units of the initial period, while Paasche used those of the final period. A geometric mean between the two (even an arithmetic mean is sufficient) is perhaps more accurate. These four formulae are all summed up by formula (2), Laspeyres using as mass units $\alpha_o$, $\beta_o$, etc.; Paasche $\alpha_m$, $\beta_m$, etc.; the geometric and arithmetic means are $\sqrt{(\alpha_o \alpha_m)}$, etc., and $\frac{1}{2}(\beta_0 + \beta_m)$, etc. *They are satisfactory only for any two years to be compared*, but the fundamental idea for perfectly unequivocal comparison for a series of years is *the cost of a definite regimen for those years.* Hence with the aid of statistics we must make such attempt as is possible to define a regimen that may be regarded as applicable to each of the years which are to be included in a comparison.* That is, we assume mean values for $\alpha$, $\beta$, $\gamma$, etc. Thus we use formula (2) or (26) with these mean values for the mass units.

We shall first shew the substantial identity of the only reasonably accurate price-ratio method, formula (11), with the aggregate-expenditure method, formula (2). Denoting the average values of the mass-units by $\alpha$, $\beta$, etc., we may shew† that if $J$ denote the result by (11) and $I$ by (2), then

$$\log J = 2\left\{\frac{\alpha ax + \beta by + \,..}{\alpha a + \beta b + \,..} + \tfrac{1}{3}\left(\frac{\alpha ax^3 + \beta by^3 + \,..}{\alpha a + \beta b + \,..}\right) + \tfrac{1}{5}\left(\frac{\alpha ax^5 + \beta by^5 + \,..}{\alpha a + \beta b + \,..}\right) + \text{etc.}\right\}$$

$$\log I = 2\left\{\frac{\alpha ax + \beta by + \,..}{\alpha a + \beta b + \,..} + \tfrac{1}{3}\left(\frac{\alpha ax + \beta by + \,..}{\alpha x + \beta b + \,..}\right)^3 + \tfrac{1}{5}\left(\frac{\alpha ax + \beta by + \,..}{\alpha a + \beta b + \,..}\right)^5 + \text{etc.}\right\}$$

in which $\dfrac{a_1}{a_0} = \dfrac{1 + x}{1 - x}$: $\dfrac{b_1}{b_0} = \dfrac{1 + y}{1 - y}$; etc.

---

* The question of variation of regimen I have considered elsewhere, but not herein.

† This has been done elsewhere.

In all ordinary cases $x$, $y$, etc., are small quantities. If we suppose them equal, the two expressions are identical. If they range in value from 1 to 10, and $\xi$ be their mean value, then the difference $\log J - \log I = -\frac{2}{3}\frac{n-1}{n+1}\xi^3$ where $n$ is the number of commodities.

If we also suppose the average expenditures on the commodities to range from 1 to 10, then $\log J - \log I =$ about $0.56\ \xi^3$ when $n = 100$, and is never large. Remembering that in practical examples $\xi$ can never be say $\frac{1}{5}$, in which case $\xi^3$ is $\frac{1}{125}$, it is easy to see that the two expressions are sensibly identical for any large number of commodities.

Since the price-index found from price-ratios, using the properly weighted geometric mean, is sensibly identical with the price-index found from the aggregate of expenditures, *it is evident that results by unweighted means of price-ratios should be rejected*, and further that the weights of price-ratios are very important.

The advantages of the method of aggregate expenditures, formula (2), may be stated as follows :—

(i.) It is incomparably superior to the unweighted price-ratio method if the mass-units are at all near the true usage-quantities.

(ii.) If the mass-units are only approximately correct, small differences in their value will not sensibly vary the result.

(iii.) One can instantly see in practical computation the influence of each term on the result, and thus estimate the effect of any uncertainties.

(iv.) It is the simplest possible of all methods, the precision of which entitles them to consideration.

Finally in this connection it may be said that, reverting to formula (26$a$) in § 10, the "weights" or expenditures $\alpha a_0$, $\beta b_0$, can be made an average (or a *probable* average if we must estimate the future) and dividing these averages by $a_0$, $b_0$, we get *mass-units*, which must on the whole be satisfactory, and further by assuming even an approximately true regimen, far more exact results will be obtained than are furnished by an imperfectly weighted price-ratio combination.

13. **Conclusion.**—The conclusion of the whole matter may be stated as follows :—

(i.) The only accurate comparison that can be made between the purchasing power of gold at any two dates is one made on the basis of a definite series of commodities. The differences between different price-indexes shew that even an extensive series of commodities does not give a definite *general result*.

(ii.) For international purposes it is desirable that a *standard-series of commodities* should be adopted, and that this standard series should be used as a basis for all international comparisons.

(iii.) That in connection with this series a definite method as to obtaining prices should be adopted so that the results in one country will be immediately comparable with the results obtained in any other.

(iv.) The prices of individual elements in this standard series should be *weighted according to the mean usage of the whole of the countries included.*

(v.) The weighted aggregate-price expressed in terms of some gold-unit (say £1) should be furnished, and the comparisons based upon the ratio of the weighted aggregate prices, that is, according to formula (2) herein. Such a comparison is perfectly accurate and definite, and there is no mathematical objection to the mode of computing it.

(vi.) In all cases where price-ratios are used, each commodity in the tabular lists should have associated with it the weight-number used in the computation of the price-index, and these numbers should be in the ratios of the expenditures on the commodities. In comparing the price-index of one period with another these changes of weights should be taken strictly into account.

(vii.) Where the weights between the two periods differ but slightly, no appreciable error will arise by taking their arithmetic instead of the geometric means.

(viii.) Where the weights are very different, the geometric mean should be employed. The general aggregate should be computed on the principle of the geometric mean, *i.e.*, the logarithms should be taken out of the price-ratios, multiplied by the mean-weight; the sum of these products, divided by the sum of the weights will be the logarithm of the result required.

(ix.) Comparisons of this character assume that the usage of the aggregate of the commodities is everywhere the mean adopted, and are, therefore, on this assumption very accurate, so far as the mere computation method itself is concerned.

(x.) It is easily seen that, for simplicity, the price-ratio method cannot compare with the aggregate expenditure method.

(xi.) A result obtained on the lines suggested can be regarded, however, only as an individual ground of comparison, viz., one of a purely international character, and its intrinsic value will depend upon the extent to which the whole series of commodities and assigned weights may be regarded as internationally significant.

(xii.) Even such a basis as this will, in the lapse of time, doubtless be subject to a progressive movement, and it may become necessary to alter periodically the list of commodities as well as to vary the weights assigned to each.

(xiii.) To the extent this alteration takes place the new price-indexes will not be directly comparable with the old, and a special investigation would be required to connect the two.

(xiv.) The international basis, moreover, will, in general, not be the best possible or most appropriate for the individual nations in the group.

(xv.) For national purposes it would not be difficult, however, to include other necessary items.

(xvi.) For practical convenience it is eminently desirable that the international group-result should be kept intact.

(xvii.) The suitable variations of weighting and inclusion of other commodities for national purposes can easily be managed through repetition of commodities with positive or negative weights, and the inclusion of other commodities with appropriate weights.

(xviii.) The same remarks apply *mutatis mutandis* in regard to the preparations of price-indexes for particular classes in a community, for it will be readily recognised that the purchasing-efficiency of money varies from class to class, and the idea that there is a general value can be regarded as correct only in so far as it may be conceived to apply to "an average individual" (*l'homme moyen* of Quetelet).

(xix.) The international comparison-basis would furnish the norm with which the price-index of each nation could be compared, and both it and the national price-index would furnish norms with which the results for different classes within the community could be compared.

(xx.) In view of the value of a properly computed price-index, the mere trouble of taking out logarithms of prices is a negligible quantity, and even this is unnecessary for the formation of price-indexes on an international basis.

(xxi.) Finally we may say that the aggregate of expenditures on a definite regimen is the only satisfactory method that is at all convenient from the standpoint of computation.

# APPENDIX IX.

## ON THE ESTABLISHMENT OF A BASIS FOR INTERNATIONAL COMPARISONS OF THE EXCHANGE-VALUE OF GOLD, AND VARIATIONS IN THE COST OF LIVING.

BY G. H. KNIBBS, C.M.G., F.R.A.S., F.S.S., ETC., ETC.
*Federal Statistician, Australia.*

SYNOPSIS.

1. Introduction.
2. On the selection of a list of commodities.
3. On the determination of the units and weights of the commodities.
4. Price-indexes deduced from aggregate-expenditures.
5. Price-indexes from price-ratios.
6. Proof that the method of price-ratios with a certain weighting is practically identical with that of aggregate-expenditures.
7. Invalidity of arithmetic mean.
8. Comparisons of price-indexes when alterations in the list of commodities or in the units adopted have been made.
9. Price-indexes when the number of commodities is greatly changed.
10. Effect of change of regimen.
11. Pseudo-continuity of price-indexes with progressive change of regimen.
12. Suggested lists of commodities and scheme of working.
13. Conclusion.

1. **Introduction.**—The financial and general relations of one nation with another are now seen to be so intimately connected, that all changes in human affairs must be discussed in their broadest aspects on an international basis. To do this effectually it is necessary that for all matters, subject to statistical analysis, *mean-values* should be established which, in virtue of their nature, may constitute *norms* for all comparisons, and for extensive generalisations. The standard of living, the habits, tendencies, and general character, the degree of civilisation, and the financial methods of the whole of the western civilised world, though divergent in details, tend more and more to closely approximate to each other, so as to constitute the world in some special sense an economic unity. For this reason *economic norms* occupy an important position among those which should be established. These will represent not merely the experience and characteristics of a particular nation, but of the whole aggregate of nations of which it is but an individual member, and which constitute the international solidarity, and among the economic norms, a series of numbers (price-indexes) which shall reveal the variations of the exchange value of the basis of the monetary system (gold), necessarily takes the place of highest importance. Reflexions upon the whole matter disclose the fact that we have arrived at that stage of world-development when it has become necessary to enlarge Quetelet's idea of the "average man" (l'homme moyen) to include the idea of a representative man of large groups of nations; indeed we must also create the idea of the "*average nation*" (la nation moyenne). This "average nation," its constitution and general

characteristics, will represent the entire western world and will constitute the proper norm for the study of the deviations of individual nations or lesser communities forming the combined group. It is evidently of the highest value for all comparative studies of national characteristics.

It will often be essential, or at least desirable, to compare smaller communities, within the nation to which they belong, not only with the international norms (the characteristics of the average nation), but also with the characteristics of the nation of which they form a part. By these two processes we may arrive at the highest form of generalised statistical knowledge.

What has been stated above may be regarded as the fundamental principle to be applied in the statistical methods of the western world as it is now constituted. It alone recognises the essential solidarity of that world, and that the significance of national variations from the international average, can be duly appreciated only by comparision with such average.

In this connection it may be observed that one of the most far-reaching elements among the relations of nations is that which touches the phenomena of the *fluctuations in the exchange-values of commodities*. The most general expression for this is in terms of money, viz., *price*, since money, being the medium of exchange for all commodities, has in consequence become the common measure of their value. Thus price, expressing inversely the exchange-value of the medium of exchange (gold) against any commodity, enables the exchange-relation between all commodities to be immediately deduced.*

It is convenient sometimes to follow, for certain purposes, the fluctuation in its exchange-value of the gold-unit rather than to follow the course of prices. In other cases, however, prices serve most readily for such comparisons as are required. Again, we may combine commodities to form a group and fix our attention on the *varying quantities of gold necessary to purchase such given group*. This idea we shall see is of the highest practical importance.

For all *international comparisons* of exchange-value it is self-evident that there must be a *common basis* in respect of the commodities selected to measure the variations of that value. Unless the basis be identical for each country, the results must necessarily be dubious; that is to say, it will become impossible to clearly distinguish between the extent to which differences in the exchange-value of gold are due to differences in the aggregate of commodities, or are due to other phenomena affecting the exchange-value, for example variations in the quantity of gold available for currency purposes, changes in the velocity of the movement of currency, or such changes as extensions or contractions of credit, etc., all of which are variations in the effective supply of the medium of exchange.

The common basis referred to, in order to be of real value, must be sufficiently extended and so weighted as regards its individual elements, as to represent the *usage of the aggregate of the nations* grouped, or what is the same thing, the usage of the "*average nation*." It is further necessary that this *one basis should be maintained for the whole period* which a particular scheme of unequivocal comparisons is designed to include.

Here, however, a difficulty arises. It is no less obvious that to maintain the reality of the comparison, the basis must change if the usage of mankind changes. A perpetually fixed basis would not represent "the usage of the average nation." It may, therefore, be admitted that any satisfactory basis will exhibit a slow progressive change in regard to the elements of which it is constituted, and the weights that must be assigned to those elements. The character of this secular variation and the question as to how the exchange-value of gold is to be estimated when the usage of the average nation has changed, must be specially investigated. To this we shall refer later, though it will form no part of the first question for our consideration. It may, however, be noted that since changes in the usage of the "average nation" will necessarily vary but slowly, and probably cannot be predicted with any

---

* For so long as the unintelligence and bad-will of mankind necessitates so wasteful a procedure, the commodity *gold* (and silver) may be regarded as in some way the *real* basis of the idea of money, and this notwithstanding the fact that the use of the precious metals will probably be greatly limited or may even cease when international obligations are certain to be honoured, or when an international credit system is sufficiently assured; a consummation which doubtless will tend to be reached in proportion as the jeopardy of war is diminished. So long as we bear in mind that we are thinking of *money* in general, rather than *actual gold*, we may use the expression "purchasing-efficiency or exchange-value of gold" to represent that reciprocal of the relation between the commodity gold and any other commodity, which is expressed as *price*. In this view "price" is looked upon as defining the instantaneous potentiality of exchange, by the artifice of a *supposed real commodity*, viz., gold.

exactitude, results must ordinarily be elaborated on a basis lasting for a given period (say a decennium), that is, on a basis which will always be a little out of date. This, however, is unavoidable, and may readily be seen to constitute no serious difficulty.

The whole question thus resolves itself into the following, viz. :—

(i.) The formulation of a sufficiently extensive *list of commodities* in common usage among the different nations included in the international group ;

(ii.) The determination of the *relative importance of these commodities* either directly, or by an appropriate combination of the results for each nation, so as to ascertain the " average " importance for the whole group ;

(iii.) The *technique* by means of which the general result is ascertained.

It would seem that the simplest way of determining the relative importance or " weight ", therefore, from an economic point of view, depends upon two elements, viz., the aggregate-usage and the price. Thus, for example, if we divide the price of a commodity for any year by the price for some other year arbitrarily selected as a datum year, the quotient may be called the *price-ratio* of those years in respect of the commodity in question. Now this may be regarded as *one* of many possible measures (viz., through any other commodity) of the variation of the exchange-value of the money-unit (gold). It is immediately obvious that the relative importance of a series of these measures would depend upon the relative expenditure on each commodity. Hence in attempting to deduce a general estimate from a series of price-ratios, we should, in order to ascertain the weight which is to be assigned to each commodity, first have to ascertain the aggregate expenditure for the whole of the group of nations concerned, or else the average price of each commodity, and the aggregate number of units used of each commodity.

If, on the other hand, we intended to base our conclusions as to variations of exchange-value on a *definite average regimen* of so many units of each commodity, then we should need either to ascertain the number of units of each commodity in the regimen from direct statistics, or we should have to divide the international aggregates of expenditure by the international averages of price, to find the number of units. As already indicated, which course it is desirable should be followed, will depend upon whether the variation in the exchange-value of gold is to be evaluated from the aggregate cost of a particular regimen (*i.e.*, of so many units of a definite series of commodities) or is to be deduced as some " weighted " mean of a series of price-ratios.

As regards the question of relative weights, it may be remarked that there is obviously no *intrinsic* relation between units, as say between a gross, of one commodity, a ton of a second, and a gallon of a third, and it is therefore evident that the only common measure of the importance is the money or exchange-value of the aggregate use of the commodity. This, however, is unfortunately variable, the variations of price themselves producing changes of " weight." The difficulties, however, are not insuperable, for in general the " means " for a large aggregate vary relatively slowly. We may assume therefore that it is practicable not only to establish a list of commodities, but also to assign to the price-ratios of each a " weight "-number, expressing its importance in the entire group. It may be further noted that this series of " weight "-numbers must apply to limited periods (*e.g.*, for a decennium), and may then be revised ; and it is of course possible also that the *list of commodities* must also be periodically revised. We can also decide on the average number of units of each used, that is, the quantities of each commodity in the average regimen.

When a list of commodities and the relative number of units of each used, or appropriate " weight " numbers are to hand, it is necessary then to decide upon a suitable arithmetical technique of comparison. The only unequivocal or *perfect* system of obtaining comparable results is to compute the aggregate-value of the whole series, from the number of units of each commodity corresponding to average usage, and the average price for the particular period (day, month, quarter or year, for example) which it is desired to compare ; see formula (3) in § 3, hereinafter. Since the arithmetical labour involved is by no means prohibitive, it may also be very desirable to watch the characteristics of monthly or quarterly fluctuations in these aggregates, for example, in order to study the variations of exchange-value of gold within the year itself, and the mean of the results of any smaller period would furnish the requisite mean value for a longer one. For example, the mean of the four quarterly results would give the mean value for a year.

These aggregate values deduced from the whole series of commodities from the prices of each, and using the proper number of units of each, enable all necessary comparisons to be made with mathematical strictness. We may define this as the "method of aggregate expenditures." This method is unquestionably better than that of using price-ratios with weights. Any year may be made a datum, and references may be made forward or backward from that year without in any way vitiating the comparison; in other words, the process in this instance is always *arithmetically consistent.* Expressed as an algebraic formula, the process is as shewn hereinafter in § 3, see (3).

A method already referred to which has been largely used and which, if properly handled, is also fairly, but never wholly, satisfactory, is to deduce the price-index from price-ratios with appropriate weights. The average price of each commodity for some year is taken as a datum, and the price-ratios are ascertained by dividing the price for any other period by the price for the datum period. The quotient. usually multiplied by 100, is the price-ratio of the latter date compared with former, When price-ratios are used, it may be shewn that the only proper mode of combination is what is known as the geometric. and this method is the only one used which is arithmetically consistent. To obtain the geometric mean each price-ratio is raised to the power indicated by the "weight," and the product of the whole of the price-ratios, so raised, is a radicand of which a root, equal to the sum of all the weights, is to be taken. The indicated operation is very simply effected by taking out the logarithms of the price-ratios, multiplying each by its corresponding weight, and dividing the sum of these products by the sum of the weights.

Expressed as an algebraic formula, this last prescription is denoted by :—

$$(1) \ldots\ldots I = \left( p^u . \quad q^v . \quad r^w . \text{ etc.} \right)^{\frac{1}{u + v + w + \text{etc.}}}$$

or logarithmically—

$$(2) \ldots\ldots \log I = \frac{u \log p + v \log q + w \log r + \text{etc.}}{u + v + w + \text{etc.}}$$

in which $p$, $q$, $r$, etc., denote the price-ratios of a series of commodities, $u$, $v$, $w$, etc., their "weights," based upon expenditures, and I the price-index required.

This process gives values very similar to the previous one, and is *arithmetically consistent.* Attempts have been made to obtain price-indexes by multiplying each price-ratio by the corresponding "weight" and dividing by the sum of the weights. Such a process, however, is arithmetically invalid, since it gives incorrect ratios between different years. In other words, it furnishes different results according as to whether we work from the calculated general result or from the original data. This is sufficient ground for excluding the method. We shall shew later on the nature of the arithmetical inconsistencies referred to, and it may here be stated that the extraordinary differences in the exchange-value of gold, indicated in the different series furnished by economists, shew that some better arrangement must be made if the price-indexes or index-numbers are to have any general validity, or are to be used critically. The most fruitful source of these differences lies in the fact that the lists of commodities are not identical, and are subject to different weightings.

**On the Selection of a List of Commodities.**—It is evident that, in order to be comparable at any two periods, a commodity must not have materially changed in character or quality. Certain commodities, for example, may give less trouble in this respect than others; for example, such raw products as may be regarded as sensibly uniform in quality, or manufactured products that do not materially change in quality. Metallic ingots, pig iron, etc., may be taken as a fair illustration of the former, sugar, flour, etc., of the latter. But even in regard to these, either differences of quality or arbitrary preferences may cause the exchange-values to range between very wide limits.

It is well to point out here that variations of exchange-value may by no means be wholly attributable to a general variation in the purchasing-efficiency of gold. For example, articles in which the cost of manufacture enormously varies* will tend to reflect conspicuously every variation in the rate of the remuneration of labour. The obvious reason of this is, that with raw materials the proportion which labour represents is usually very small as compared with what it represents in very highly elaborated products.†

---

* Contrast such forms of *steel* manufacture as heavy springs for railway fittings, with watch-springs; or contrast say the production of heavy and chiffon *silks*. † For example with such commodities as watch-springs, in which the value of the raw material is wholly negligible, the resulting price depends practically wholly upon the cost of labour directly or indirectly.

It is self-evident that, with such commodities, the governing element is the rate of remuneration for labour, and that the price of the commodity tends merely to reflect the variations of this element.

As a consequence of the operation of influences of this kind, it would seem that in an international inquiry, either as to wholesale or retail prices, all commodities in common usage, and of which the quality is comparable and identifiable, might probably be included, but whether this be so or not will depend upon the fundamental purpose of the inquiry.

If, however, we were compiling a world-wide index-number, representing variations in the exchange-value of gold, it might probably be desirable not to include all commodities the qualities and characters of which are comparable and indentifiable, but merely those for which, in addition, world-markets exist. Thus it might be desirable to *exclude* all such vegetables, fruits, etc., the price of which would necessarily be governed mainly by *local* conditions. In a pure "cost-of-living" comparison such commodities and their prices could *not* of course be excluded.

We have seen that *variations in exchange-value are not wholly attributable to variation in the purchasing-efficiency of gold against ordinary commodities*, excluding labour, and further, that the object of the measure of the exchange-value varies according to the characteristics in the group of commodities by means of which it is measured.

It is clear from the considerations just indicated that the series of commodities should not only be individually identifiable in respect of character and quality, but should also be well selected from such point of view as is important, otherwise the derived results will be dubious, and it is here that the principal difficulty arises, though there is no escape from it.

It must be observed at the same time, however, that progress in the technique of industry indicates that we can push this principle too far, a good illustration of which would be the state of steel manufacture before and after the introduction of the Bessemer and the Siemens-Martens processes. Other examples that might be cited are sugar, chemical products, etc., in which there have been striking advances in quality. The advances in technology have led in many cases to marked improvement in the quality of the manufactured articles. Since, however, the use of the article, thus improved in quality, may be continuous, and the change in quality may proceed by imperceptible changes, a feature not uncommon with regard to textiles, for example, it is not always possible to take so exact an account of differences of quality as has been indicated as necessary.

Neglect of facts of this kind may easily betray one into an *undue faith in price-ratios,* and into the false belief that price-ratios for aggregates are *unequivocally* valid measures of the variations in exchange-value of gold, whereas the truth of the matter is that *changes in the exchange-value* of gold have been confused in the general result with variations in the *quality* of the articles, and consequential changes in their cost, utility, or esteem values.

What has been said is sufficient indication that in the selection of a series of commodities for the international basis, extreme care will have to be exercised. I have suggested a series, and have indicated their weight numbers at the end of this Appendix. This is done merely tentatively and purely by way of suggestion. It is supposed that each item in this series is identifiable with sufficient certainty to make the aggregate cost of the whole series reliable. It cannot be too distinctly borne in mind that the difficulty is not in any way got over by the use of price-ratios, as is sometimes supposed, *but is only hidden so as to be less readily discerned.*

The question of the significance of labour in the cost of commodities already referred to is worthy of special attention. We proceed to consider the matter.

The fact that commodities differ greatly in respect of the value of the raw material of which they are composed, and the amount of labour which has to be applied to that material in order to give them their final form, suggests that regard should be had thereto in the scheme of classification.*

As between one commodity and another the ratio of the two varies greatly, and *price* will tend to reflect all variations in the remuneration of labour in proportion as the labour element in the production of the commodity is large.

---

* To revert to a former illustration, the value of a watch-spring may be said to be due wholly to the cost of labour required to produce it, and it stands, therefore, in a very different economic position to, say a large and simple casting, the raw material being pig-iron, because for the production of the latter the element of cost of labour enters relatively to a much less extent. And even if in the last analysis it could be assumed that the original raw material is without value until labour is expended thereon, which is not always true, the fact still remains that we shall do well in any classification to have regard to the value of labour in production, as compared with the value of the raw material.

From this it can be seen that it matters much whether the aim of an inquiry be to ascertain the efficiency of gold in respect to commodities *as influenced by wages, or as not influenced by wages*, and it is from this point of view that it may at once be seen how desirable it is that the list of commodities should be so divided as to furnish series shewing progressive amounts of labour applied to their production. In this way it will become possible to detect the influence upon price of ruling rates of wages. If, therefore, a whole series of commodities be divided into several classes, each class shewing progressively larger amounts of labour, then we shall have the material for discriminating between the purchasing efficiency of gold in regard to raw material and highly elaborated materials, and will have the data to ascertain how far demands for higher wages are merely equating themselves by a rise in prices. For if it were possible for the prices of commodities to rise throughout in the same ratio as wages, then there would be no advantage, the change would be merely a *nominal* one. It is from this point of view that one sees that, in so far as change of remuneration for labour results in increased prices, the advantage tends to become *unreal*, and is nullified the money which is paid for labour giving to its recipient no advantage in purchasing the commodities which satisfy his needs.

It is evident that this matter is of eminent economic importance. If in making, finally, the comparison of the price-indexes of the successive series of commodities in which the element of labour is playing a more and more conspicuous part and in which consequently the influence of the remuneration of labour is more and more felt it turns out that the latter tends to closely correspond to variations in the rate of wages, then the obvious economic deduction is that the result is due to variations in the remuneration of labour. Should the variations completely correspond with change in the cost-of-living for the class represented, the effect of rise in wages will be completely nullified by the rise in the price of the commodities used.

It will be seen from these considerations that the *divisions* of the list of commodities should, as far as possible, be *homogeneous* with respect to the relative cost of raw material to labour in the production of the commodity. We may conclude, therefore, that so far as the selection of commodities is concerned, the following principles may serve as a guide, viz. :—

(i.) The commodities should be identifiable in respect of their essential characters.

(ii.) They should be largely used.

(iii.) The whole series should be divided roughly into groups, homogeneous with respect to the relative value of raw material, and labour applied to convert each commodity into its final form.

(iv.) Only commodities which find a world-market should be used for international comparisons. for variations in the exchange value of gold.

(v.) A supplementary list of commodities of local production are necessary if it be desired to determine such variations in the cost of living as may be attributable to variations in the exchange value of gold.

3. **On the Determination of the Units and Weights of the Commodities.**—The unit by means of which different commodities are usually measured, may be volume or weight, or number of articles, etc. ; for example, in English measure, a gallon or a bushel, a pound or a ton, a gross or dozen, etc. All such quantities or units may be called *mass-units*, and the number taken for each commodity should be in the ratio of their actual usage. It is instantly evident, however, that there is no intrinsic relationship between economic value and the mass-units of different commodities ; for example, between a carat, in the measurement of the precious stones, and a gallon in the measurement of spirits ; in fact it is readily perceived that in the nature of the case there can be only one common measure for the relative economic importance of different commodities in question of variation of exchange-value, and that is *the product of the money-value of a unit, and the number of units used*, or upon the *relative aggregate expenditure* on the commodity. As previously indicated, when we suppose the number of units used to be constant at any two dates for which a comparison is desired, the best—in fact the only exact—comparison is the ratio of aggregate expenditure at the compared date to the aggregate expenditure at the original date. If the number of units of each commodity were not constant, then any deduced price-index would be vitiated by what may be called *change of regimen*. For this reason, once we decide upon the size of the unit which is to be compared, the mass-weight-number of units of usage may be determined by dividing the total expenditure by the price, and it is to be assumed that this number of units is constantly used throughout the periods compared.

There is, however, a much simpler way of stating the whole matter, viz., the following :—

It is obvious that when we use price-ratios the actual size of the unit used disappears. For example, price per ton divided by price per ton is the same thing as price per pound divided by price per pound. This has led to an erroneous opinion that price-ratios get rid of the necessity for considering the size of the unit, and that the weights assigned to the price-ratios in any computation represent the relative importance of the commodities. The relative importance, however, is measured by the aggregate expenditure since the money-unit is the only common measure of economic value or exchange-value. If, therefore, relative aggregate expenditure on any commodity (*i.e.*, the proportion of the expenditure on the commodity in question to the aggregate expenditure on all commodities) be equal on any two occasions, the combining " weight " of the commodity remains unchanged, in the computation of price-indexes from price-ratios.

From this point of view it becomes apparent that it is possible to compute a general variation in the exchange-value of gold with fair accuracy, *although the regimen on successive occasions* may have changed. Without doubt this fact has also given rise to the *erroneous* impression that price-ratios are to be preferred, and that they escape the difficulty about a *constant regimen.* It may be pointed out, however, that the basis of comparison should undoubtedly be the mean-weight between the two occasions, but to take this into account the arithmetical work of comparison is greatly elaborated and tends to become prohibitive. We shall return to this point later. It will suffice here to observe that a very much more convenient system could be adopted, by using units of quantity which can be regarded as representing the average use of all the nations in the international comparison.

If for the aggregate of nations a list, shewing the total expenditure upon the various items of a whole series of commodities during any definite period of time existed, this would represent the usage, and furnish the required number of units, or the mass-weights, the supposition being that that usage expressed the habit or the necessity of the people. It would indicate the economic weight that should be attributed to the individual item, by the ratio which expenditure on that item bore to the aggregate of all expenditures on the list. Futher, if, as is desirable, it were preferred to use numbers of "mass-units" of each commodity so as to form aggregates by summing the prices multiplied by these units to form totals for the dates to be compared (the ratio giving the price-index) then all that is necessary is to divide the international aggregates of expenditures by the international average prices. The quotients are the units required.

It may here be observed that questions of exchange-value are very properly dissociated from those of *utility-value*, *esteem-value*, and *cost-value* or other special measures of value, for many commodities obviously have esteem-values wholly out of relation to their cost-values ; in fact, business-practice endeavours to create esteem-values so markedly above cost-values as to ensure large profits to the manufacturer or supplier. In the questions with which we are dealing, however, exchange-value is the only value that need be considered.

4. **Price-Indexes Deduced from Aggregate-Expenditures.**—It has already been said that much of the technique in connection with the determination of variations in exchange-value practically involves the clouding of the real issue in generalities ; that *the comparison is unreal or dubious to the extent that the regimen has changed,* and that the preference for price-ratios merely arises from the fact that the defect in the technique of computing price-indexes from them has been relegated to a position where it is not discernible. In order to bring the matter into clear relief, let us take a very elementary case where only two commodities are under consideration, and observe exactly what takes place in different methods of combination. We shall denote the basic date by the suffix 0 attached to any quantity, and the second or later date by the suffix 1, the two commodities being denoted by A and B. We shall suppose the usage of these commodities at the two dates to be as expressed in the following schedule :—

| Commodity. | Date 0. | | | Date 1. | | |
|---|---|---|---|---|---|---|
| | Units. | | Price. | Units. | | Price. |
| A | 1 | @ | 3 | 1 | @ | 6 |
| B | 2 | @ | 4 | 3 | @ | 5 |

and let us use first the method of the ratio of aggregate expenditures which, expressed algebraically, is—

$$(3) \ldots\ldots\ldots\ldots\ldots \quad I = \frac{\alpha a_1 + \beta b_1 + \gamma c_1 + \text{etc.}}{\alpha a_0 + \beta b_0 + \gamma c_0 + \text{etc.}}$$

in which $\alpha$, $\beta$, $\gamma$, etc., are the number of units of each commodity used at each date, and $a$, $b$, $c$, are the prices of those units, the suffixes denoting the dates. We observe first of all that in the case considered there have been *changes in both regimen and price*, but to determine the variation in the exchange-value of gold we must eliminate the effect of change of regimen. Let us then first consider a comparison based upon a supposed *constancy of regimen*. Thus we may take into account three cases, viz., where the regimen at the second date is as at the first; where the regimen at the first date is as at the second; and where the regimen is the arithmetic mean of the regimens at the two dates. This will give us the result shewn hereunder as the effect of change of price, viz.:—

(i) the regimen consists of one unit of the first commodity, and two units of the second commodity on both dates;

(ii.) the regimen consists of one unit of the first commodity, and of three of the second on both dates; and

(iii.) the regimen consists of one unit of the first commodity, and two-and-a-half of the second commodity.

We thus get the following results:—

Regimen of date 0; (i.);
$$\frac{1 \times 6 + 2 \times 5}{1 \times 3 + 2 \times 4} = \frac{16}{11} = 1.4545$$

Regimen of date 1; (ii.);
$$\frac{1 \times 6 + 3 \times 5}{1 \times 3 + 3 \times 4} = \frac{21}{15} = 1.4000$$

Regimen an arithmetic mean of that at each date; (iii.);
$$\frac{1 \times 6 + 2\frac{1}{2} \times 5}{1 \times 3 + 2\frac{1}{2} \times 4} = \frac{18\frac{1}{2}}{13} = 1.4230$$

5. **Price-Indexes from Price-Ratios.**—Suppose now that we attempt to calculate such results by means of price-ratios. We have the following price-ratios for the two dates, (1)/(0), $p$ denoting price-ratio for commodity A, and $q$ denoting price-ratio of commodity B.

| Commodity A. | Price Ratio. | Commodity B. | Price Ratio. |
|---|---|---|---|
| $p$ | $= \frac{6}{3} = 2.$ | $q$ | $= \frac{5}{4} = 1.25.$ |

At the first date the aggregate expenditure was 11, of which 3 was on A and 8 on B, therefore the relative importance for A was $\frac{3}{11}$ and for B $\frac{8}{11}$. At the second date the aggregate expenditure was 21, of which 6 was for A and 15 on B, therefore the relative importance on the second occasion was $\frac{6}{21}$ or $\frac{2}{7}$ for A, and $\frac{5}{7}$ for B. Hence the arithmetic mean of the weights was—

$$\text{For A,} \quad \frac{1}{2}\left(\frac{3}{11} + \frac{2}{7}\right) = \frac{43}{154} = u, \text{ say;}$$

$$\text{For B,} \quad \frac{1}{2}\left(\frac{8}{11} + \frac{5}{7}\right) = \frac{111}{154} = v, \text{ say.}$$

Hence, working by the geometric means, we have—

$$log.\left\{(p^u\, q^v)^{\frac{1}{u+v}}\right\} = \frac{\frac{43}{154}\, log.\ 2 + \frac{111}{154}\, log.\ 1.25}{\frac{43}{154} + \frac{111}{154}} = \frac{23.7013}{154} = 0.153904.$$
$$= log.\text{ of } 1.4253.$$

Now this last result is sensibly identical with what we found by taking the aggregate, and is nearly the mean of the results by suppositions (i.) and (ii.), viz., 1.4272. (If we take the *geometric mean of the weights* instead of the arithmetic mean we get:—

$$\text{For A,} \quad \sqrt{\left(\frac{3}{11} \cdot \frac{2}{7}\right)} = 0.27914;$$

$$\text{For B,} \quad \sqrt{\left(\frac{8}{11} \cdot \frac{5}{7}\right)} = 0.72075.$$

the sum of which is 0.99989, and this gives 0.1538963 the logarithm of 1.4253 as before.)

Two things are obvious from the example furnished for the case of two commodities, viz. :—

(*a*) That with a large number of commodities the mean number of units used of each may be taken as a basis for computation of a price-index from the ratio of aggregate expenditures at any two dates, (formula 3); and also

(*b*) that price-ratios weighted in proportion to the average expenditure will yield an almost *identical* result.

This may be shewn formally by finding an algebraic expression for the difference ($D$)—

$$(4)..D=\left(p^{u}.\ q^{v}.\ r^{w}.\ \text{etc.}\right)^{\frac{1}{u+v+w+\text{ etc.}}} - \frac{\alpha a_1+\beta b_1+\gamma c_1+\text{ etc.}}{\alpha a_0+\beta b_0+\gamma c_0+\text{ etc.}} = H\text{—}K, \text{ say.}$$

in which $u = \frac{1}{2}\,\alpha\,(a_0 + a_1)$; $v = \frac{1}{2}\,\beta(b_0 + b_1)$; and $w = \frac{1}{2}\,\gamma(c_0 + c_1)$.

6. **Proof that the Method of Price-Ratios, with Weighting according to Average Expenditure, is Practically Identical with that of Aggregate-Expenditures.**—Since the method of determining price-indexes from price-ratios is commonly supposed to possess some advantages through its apparent generality, and since also such opinion is not sound, it is not unimportant to shew conclusively that it yields sensibly identical results in all practical cases. This may be shewn formally by finding an algebraic expression for the difference ($D$) above.

We may put $a$ for $\frac{1}{2}(a_0 + a_1)$; $b$ for $\frac{1}{2}(b_0 + b_1)$; etc.; and also $a_0 = a(1\text{—}x)$; $a_1 = a(1 + x)$; and similarly throughout.

Then we have

$$\frac{a_1}{a}\Big/\frac{a_0}{a} = \frac{a_1}{a_0} = \frac{1+x}{1-x}; \qquad \frac{b_1}{b_0} = \frac{1+y}{1-y}.$$

In all practical instances $p$, $q$, $r$, etc., do not differ greatly from unity, hence the quantities $f(1 \pm x)$, etc., can be expanded in convergent series. Thus we have to find the value of—

$$(4a)..D\left\{\left(\frac{1+x}{1-x}\right)^{\alpha a}.\left(\frac{1+y}{1-y}\right)^{\beta b}\right\}.\text{etc.}^{\frac{1}{\alpha a+\beta b+\text{etc.}}}\ \frac{\alpha a(1+x)+\beta b\,(1+y)+\text{etc.}}{\alpha a(1\text{—}x)+\beta b\,(1\text{—}y)+\text{etc.}} = H-K, \text{ say.}$$

The values of log $H$ and log $K$ are :—

$$(5)....\log H = 2\left\{\frac{\alpha ax+\beta by+...}{\alpha a+\beta b+...}+\frac{1}{3}\left(\frac{\alpha ax^3+\beta by^3+\ ...}{\alpha a+\beta b+...}\right)+\frac{1}{5}\left(\frac{\alpha ax^5+\beta by^5+\ ...}{\alpha a+\beta b+...}\right)+\text{etc.}\right.$$

$$(5a)....\log K = 2\left\{\frac{\alpha ax+\beta by+...}{\alpha a+\beta b+...}+\frac{1}{3}\left(\frac{\alpha ax+\beta by+...}{\alpha a+\beta b+...}\right)^3+\frac{1}{5}\left(\frac{\alpha ax+\beta by+...}{\alpha a+\beta b+...}\right)^5+\text{etc.}\right.$$

Therefore—

$$(6)....\log H\text{—}\log K = \frac{2}{3}\left\{\frac{\alpha ax^3+...\text{ etc.}}{\alpha a+...\text{ etc.}}-\left(\frac{\alpha ax+\text{ etc.}}{\alpha a+\text{ etc.}}\right)^3\right\}+\frac{2}{5}\left\{\text{etc.—etc.}\right\}+\text{etc}$$

Thus the first and large term of the expressions for the logarithms of $H$ and $K$ agree, but the second and subsequent terms differ. The unequivocal condition that these terms shall be equal is that the prices have all increased or all diminished in the same ratio, viz., that $x = y = z$, etc., in which case the second terms become $\frac{2}{3}x^3$ in each case, the third $\frac{2}{5}x^5$, and so on: that is, the two expressions are then equal throughout. We shall shew also that in all practical cases they are equal; and first we note that the quantities $\alpha a$, $\beta b$, etc., are always positive, but that $x$, $y$, $z$, etc., may be all positive, all negative, or may not be all of one sign: the latter is ordinarily the case. The quantities being of the same order of magnitude, it is obvious that the difference between the terms would be greatest when they

are all of the same sign. We consider the case, therefore, where $\alpha a = \beta b =$ etc., but $y = 2x$ , $z = 3x$ , etc., In this case the average value for $x$, $y$, etc., will be $\frac{1}{2}$ (n + 1) $x = \xi$ say, $n$ being the number of commodities. Consequently we shall have for the value of the two cubic terms—

$$\frac{2}{3} \quad \frac{\alpha a x^3 \Sigma^n n^3}{\alpha a n} = \frac{1}{6n} \left\{ n(n+1) \right\}^2 x^3 = \frac{4}{3} \frac{n}{n+1} \xi^3 \text{ and } \frac{2}{3} \left( \frac{\alpha a \Sigma_1^n n x}{\alpha a n} \right)^3 = \frac{2}{3} \quad \xi^3$$

The difference, therefore, in this instance is—

$$\log H - \log K = - \quad \frac{2}{3} \xi^3 \quad \frac{n-1}{n+1}$$

which is $\frac{2}{3}$ $\xi^3$ when $n$ is infinite, and is only about 2% short of $\frac{2}{3}$ $\xi^3$ when $n$ is 100.

If further, we suppose that $\beta b = 2\alpha a$ ; $\gamma c = 3\alpha a$, etc., and $y = 2x$, $z = 3x$ , etc., as before, we shall have instead of the above—

$$\frac{16}{45} \cdot \frac{2n + 1}{(n + 1)^3} \quad (3n^2 + 3n - 1) \; \xi^3 \text{ and } \frac{16}{81}\left(\frac{2n + 1}{n + 1}\right)^3 \xi^3$$

the difference of which is—

$$\log H - \log K = \frac{\xi^3}{405} \cdot \frac{2n + 1}{(n+1)^3} \left\{ 144\,(3n^2 + 3n - 1) - 80\,(2n + 1)^2 \right\}$$

which has a value of about 0.56 $\xi^3$ when $n = 100$.

In examples practically occurring we can never have the average value of $\xi$ as great as, say, $\frac{1}{5}$ , viz., its value when all commodities have on the average advanced about 50%. Hence $\xi^3$ is less than $\frac{1}{125}$ , and in the three cases considered for 100 commodities, the difference would be 0, or less than $\frac{1}{375}$ and $\frac{1}{250}$ respectively. This is the difference in the two logarithms, but each is ordinarily the logarithm of a number somewhere near unity, and consequently represents approximately the ratio of the error itself.

It has thus been proved that $H$ and $K$ are sensibly equal in the circumstances of the case under consideration. It is obvious from this that, if the use of weighted price-ratios is deemed to be justified on the ground of any supposed generality in combining different measures of the exchange-value of money, then it follows from formula (6) that the method of ratios of aggregate expenditures, formula (3), is also valid. It is certainly the simpler to use, and computation of price-indexes is greatly facilitated by its use. This, however, while not unimportant, is not its chief merit, which is that *the computer sees clearly what he is doing*, while in the use of price-ratios it is by no means obvious that improper weighting vitiates the results. It is now seen that *the method of price-ratios with inaccurate weights is sensibly equivalent to forming an aggregate with units which do not represent the actual average usage.*

It has been already indicated that the *weighted geometric mean* of the price-ratios is alone valid, and it has been shewn that the method of deducing price-indexes from the ratio of aggregates of expenditure, based on the use of a constant number of units, is substantially identical therewith. It now remains to consider the method of arithmetic means, not unfrequently used.

The following demonstration that even the weighted arithmetic mean is invalid is therefore not unimportant. That the *unweighted mean* is quite invalid can be readily seen to be a consequence of the preceding proof of the approximate identity of the aggregate expenditure and price-ratio methods of deducing price-indexes. But we shall now examine the question of the legitimacy of using a weighted mean in another way.

7. **Invalidity of Arithmetic Mean.**—Using the suffixes preceding and following $I$, the price-index, to denote the dates to which it applies, we have by the method of the arithmetic mean of weighted price-ratios

$$(7) \ldots\ldots\ldots \; {}_0I_1 = \frac{up + vq + wr + \text{etc.}}{u + v + w + \text{etc.}}$$

Hence if we make date 1 the basis, and obtain the price-index for date 0 in relation thereto, we ought to obtain by the same process—

$$(7)\ldots\ldots\ {}^1I_0 = \frac{u\dfrac{1}{p} + v\dfrac{1}{q} + w\dfrac{1}{r} + \text{etc.}}{u + v + w + \text{etc.}}$$

since each price-ratio is the reciprocal of the former, and this expression (7*a*) should equal the reciprocal of the preceding one, viz., (7) that is, if the method were arithmetically valid. But if this equality held we should have—

$$(u+v+w+\text{ etc.})^2 = (up + vq+wr+\text{etc.})\ (u\frac{1}{p} +v\frac{1}{q}+w\frac{1}{r} + \text{etc.})$$

We see, that so far as the sum of the squares of the quantities $u$, $v$, etc., is concerned, the two sides are identical, but so far as the products in pairs go the right hand side is always greater than the left when $p$, $q$, etc., are not equal. Or, limiting the consideration to two price-ratios, we have to shew that—

$$\frac{\dfrac{u}{p}+\dfrac{v}{q}}{u+v} \text{ should equal } \frac{u+v}{up+vq}$$

if the method be arithmetically consistent. Multiply both expressions by $(u + v)(up + vq)$, we then have :—

$$u^2 + \left(\frac{p}{q}+\frac{q}{p}\right) uv + v^2 \text{ should equal } u^2 + 2uv + v^2$$

that is, $p/q + q/p$ should equal 2. It, however, always exceeds that quantity unless $p = q$. The method of taking weighted arithmetic means, formula (7) is consequently arithmetically invalid, *being irreversible*; in other words, *if price-indexes for a series of years are computed by the formula, they do not furnish the same ratios among one another as are furnished by the original data using the same process.*

The weighted geometric mean, on the other hand, formula (1), is consistent, and furnishes a series of price-indexes which furnish the same ratios as are furnished by the original data.

8. **Comparisons of Price-Indexes when Alterations in the List of Commodities or in the Units Adopted have been made.**—It has already been pointed out that if price-indexes are to be strictly accurate, then change of regimen, that is to say, either a change in the actual list of commodities or in the units adopted for individual members of the list, cannot be admitted, otherwise *variation in the exchange-value of gold becomes confused with the effect of change of regimen.* The conception that new commodities may also furnish additional evidence of the exchange-value of gold is valid only when they belong to both periods to be compared. More definitely, if $\alpha$, $\beta$, $\gamma$, $\delta$, etc., denote the numbers of units of the commodities A, B, C, D, etc., we cannot compare regimen $\alpha A + \beta B + \gamma C$ etc., with say $\beta_1 B + \gamma_1 C + \delta_1 D$ etc., though we could of course, as already shewn, compare regimen $\beta B + \gamma C$ with $\beta_1 B + \gamma_1 C$, the commodities B and C being common to both. Thus comparison can be made for example by assuming an arithmetic mean regimen, viz., $\frac{1}{2}(\beta+\beta_1)B + \frac{1}{2}(\gamma+\gamma_1)C$ + etc., to apply to the dates to be compared.

While the above statement is true, it is also true that the validity of any computation of price-indexes becomes of questionable value if the adopted list of commodities with assigned units of usage, (or price-ratios with their assigned weights) fails to coincide with the usage of the group of nations aggregated for international comparisons. The two things to be attended to are (i.) what may be called *arithmetical validity*, and (ii.) *conformity to economic facts.* From this point of view, it is to be regarded as inevitable that in the course of time changes will occur both in the commodities and their units of usage (or the weights assigned to their changes of price-ratios) in the international list. A revision, therefore, could perhaps be made every ten years, and the question then arises whether continuity in the exchange-value relation can be established, and if at all, in what way.

Let us suppose that, for one decennium, say, the comparisons have been based upon $m$ commodities, and that then a change is made, and comparisons are afterwards based on $n$ commodities. Of these $m$ and $n$ commodities let us suppose also that there are $k$ common to each series; and moreover, that the units used (or the

series of weights assigned to price-ratios) used are not the same on the two occasions. We have already shewn that in such a case we can found a comparison only on some common regimen, preferably the arithmetic mean of the units used (or, if price-ratios are used, the mean of the weights assigned to the prices of these $k$ commodities).

Primarily it is to be observed that *strictly we can make a comparison only through the k commodities constituting that part of the regimen common to the two periods.* This is evident from the fact that change of regimen produces its own effect on the aggregate of a list of commodities, or on the weighted mean of price-ratios, the exchange-value of money being constant. And it is for this reason that, if we want to compare the exchange-value at any two periods we can do so only on some given number of units of a group of commodities existing at both periods; and to have the highest significance these assigned units of usage should, *as near as possible*, express the actual usage at either date, and hence may be taken as the arithmetical mean of the units at either date or of the weights used in connection with the price-ratios. For the method of aggregates the units may be the arithmetical means of the units used in either.*

It is obvious from this that *there can be no real continuity in a series of price-indexes where the series of commodities used or the units of usage have changed, or where the weights assigned to the price-ratios of individual commodities have altered.* For this reason, when a change of basis is made, the results should be computed on the old basis for the first year of the new series. Thus for this year the aggregates are formed on both bases, the one giving the closing value of the price-indexes, and their value is the factor to be used for the results given in the new series. The supposition, however, that by this process the second series of price-indexes is *perfectly* continuous with the old series is subject to some qualification, for the new series cannot strictly be referred back in this way. A perfect comparison between any two periods can be made only on the basis of the average usage of the series of commodities common to the two dates, the units assigned being a mean of the units assigned for the two dates.

To express the whole matter definitively, let $\Sigma_0$, $\Sigma_1$, etc., denote respectively the aggregates $\alpha' a_0 + \beta' b_0 +$ etc.; $\alpha' a_1 + \beta' b_1 +$ etc.; $\alpha' a_j + \beta' b_j +$ etc.; the units $\alpha'$, $\beta'$, etc., denoting the quantities regarded as constant throughout the first period (say a decennium). At the end of this period a change is made in the commodities and the units; viz., for the date denoted by $j$ ($j$ would be 10 if the change were decennial), and $\alpha''$, $\beta''$, etc., are the units used in the second period.

Then we can obtain an *imperfect continuity* of the exchange-values by forming the price-indexes according to the following scheme, viz.:—

$$(8) \ldots\ldots {}_0I_1 = \Sigma_1 / \Sigma_0\,;\ {}_0I_2 = \Sigma_2 / \Sigma_0\,;\ \ldots\ {}_0I_j = \Sigma_j / \Sigma_0\,;\ \text{etc.}$$

Then if for $\Sigma_j$ we form a second sum, using the new units and denote this by $\Sigma'_j$, we shall have—

$$(9) \ldots\ {}_0I_j = \Sigma_j / \Sigma_0\,;\ {}_jI_{j+g} = \Sigma'_{j+g} / \Sigma_j\,;\ {}_0I_{j+g} = (\Sigma_j / \Sigma_0)\,(\Sigma'_{j+g} / \Sigma'_j).$$

in which $g$ denotes any year in the second period; or fully expressed:—

$$(10) \ldots\ {}_0I_{j+g} = {}_0I_j \,.\, {}_jI_{j+g} = \frac{\alpha' a_j + \beta' b_j + \text{etc.}}{\alpha' a_0 + \beta' b_0 + \text{etc.}} \cdot \frac{\alpha'' a_{j+g} + \beta'' b_{j+g} + \text{etc.}}{\alpha'' a_j + \beta'' b_j + \text{etc.}}$$

It is obvious from this last expression that any dissimilarity in the aggregate of the units of usage for the two periods does not prejudice the results, directly. Nevertheless it is equally obvious that the results of the second period are *not* strictly comparable with those of the first period. For the proper relation between any two results should be based on the mean number of units used for the two dates, and thus would be as follows:—

Let $\alpha$ denote $\frac{1}{2}(\alpha' + \alpha'')$; $\beta$ denote $\frac{1}{2}(\beta' + \beta'')$; etc. Then the results for the year say 0 and the year $j + g$ should be

$$\text{Correct result— } {}_0I_{j+g} = \frac{\alpha a_{j+g} + \beta b_{j+g} + \text{etc.}}{\alpha a_0 + \beta b_0 + \text{etc.}}$$

The tabular results according to formula (10) would, however, differ from this. The measure of this difference we propose now to determine, and we consider first the case *where the changes in the number of units of usage are relatively small*, and where

* This, as has been shewn, gives in general almost the same results as the geometric mean.

the commodities are the same. In this case we may put $\alpha' = \alpha\,(1 - x)$ and $\alpha'' = (1 + x)$; $\beta' = \beta\,(1 - y)$, and $\beta'' = \beta\,(1 + y)$, etc., then by interchanging the factors of the numerators the expression (10) may be written—

$$(11) \ldots\ldots \frac{\alpha\,(1+x)\,a_{j+g} + \beta\,(1+y)\,b_{j+g} + \text{etc.}}{\alpha\,(1-x)\,a_0 + \beta\,(1-y)\,b_0 + \text{etc.}} \cdot \frac{\alpha\,(1-x)\,a_j + \beta\,(1-y)\,b_j + \text{etc.}}{\alpha\,(1+x)\,a_j + \beta\,(1+y)\,b_j + \text{etc.}}$$

$$= \frac{\alpha a_{j+g} + \beta b_{j+g} + \text{etc.} + (x\alpha a_{j+g} + y\beta b_{j+g} + \text{etc.})}{\alpha a_0 + \beta b_0 + \text{etc.} - (x\alpha a_0 + y\beta b_0 + \text{etc.})} \times \frac{\alpha a_j + \beta b_j + \text{etc.} - (x\alpha a_j + y\beta b_j + \text{etc.})}{\alpha a_j + \beta b_j + \text{etc.} + (x\alpha a_j + y\beta b_j + \text{etc.})}$$

If $S$ denote the sum of the quantities outside the brackets, and $s$ the sum of the quantities within the brackets, then this last expression may be written—

$$(12) \qquad \frac{S_{j+g} + s_{j+g}}{S_0 - s_0} \cdot \frac{S_j - s_j}{S_j + s_j} = \frac{S_{j+g}}{s_{j+g}} \cdot \frac{\left(1 + \frac{s_{j+g}}{S_{j+g}}\right)\left(1 - \frac{s_j}{S_j}\right)}{\left(1 - \frac{s_0}{S_0}\right)\left(1 + \frac{s_j}{S_j}\right)}$$

Now $S$ is a very large quantity compared with $s$, therefore $s/S$ is a very small quantity compared with unity, and consequently the right-hand factor in this last equation (with four brackets) must be very nearly unity. It can be seen somewhat more clearly if we put

$$(13) \ldots\ldots\ S = \frac{1}{3}\,(S_0 + S_j + S_{j+g});\ s = \frac{1}{3}\,(s_0 + s_j + s_{j+g});$$

and also

$$(13a) \ldots\ldots\ S_0 = S\,(1 + \xi);\ S_j = S\,(1 + \eta);\ S_{j+g} = S\,(1 + \zeta);$$

and

$$(13b) \ldots\ldots\ s_0 = s\,(1 + \chi);\ s_j = s\,(1 + \phi);\ s_{j+g} = s\,(1 + \psi);$$

so that we shall have

$$(13c) \ldots\ldots\ \xi + \eta + \zeta = 0;\ \text{and}\ \chi + \phi + \psi = 0.$$

The expression (12) then becomes—

$$(14) \ldots\ldots\ {}_0I_{j+g} = \frac{S_{j+g}}{S_0} \cdot \frac{\left\{1 + \frac{s}{S}\left(\frac{1+\psi}{1+\zeta}\right)\right\}\left\{1 - \frac{s}{S}\left(\frac{1+\phi}{1+\eta}\right)\right\}}{\left\{1 - \frac{s}{S}\left(\frac{1+\chi}{1+\xi}\right)\right\}\left\{1 + \frac{s}{S}\left(\frac{1+\phi}{1+\eta}\right)\right\}}$$

It is obvious that in this expression the whole of the terms denoted by Greek letters are small terms, and are also terms of the same order; and it is evident, therefore, that unless prices or weights change very greatly the right-hand factor may be taken as unity.

It may be pointed out that in actual cases the quantities $S_0$, $S_j$, and $S_{j+g}$ are sensibly identical to the order of, say, several per cent. only; and $s_0$, $s_j$, and $s_{j+g}$ are usually very small; hence this factor in brackets will in general be so near unity as often to be satisfactory. In other words, the quantities $x\alpha a$, $y\beta b$ etc., are of a much smaller order than $\alpha a$, $\beta b$, etc., and, entering into the result some with the + and others with the − sign, tend consequently to disappear in the final result.

It may be proper here to note that this last expression shews at once the advantage of the weights being so determined that, for the year on which the basis is changed, the aggregate of expenditures calculated with the two systems of weights shall be identical; for in such a case the values of $\alpha'$ and $\alpha''$, $\beta'$ and $\beta''$, etc., differ on the average the least possible. We may say finally that if the value of the right-hand factor of (12) (viz., that containing the four quantities in brackets) is unity then the continuity is satisfactory; if not, then it is unsatisfactory, and in proportion as it differs from unity: this expression or its equivalent (14) affords, therefore, the necessary criterion.

We shall see later that it is desirable that the units for the second period should be so determined that for the year of change $\Sigma_j = \Sigma'_j$. As soon as the relative numbers $\alpha''$, $\beta''$, etc., of the various units have been ascertained, this can readily be effected by multiplying these by an appropriate factor, $\kappa$, given by the formula

$$(15) \ldots\ldots \kappa = \frac{\Sigma_j}{\Sigma'_j} = \frac{\alpha' a_j + \beta' b_j + \text{etc.}}{\alpha'' a_j + \beta'' b + \text{etc.}}; \text{ that is } \kappa\,(\alpha'' a_j + \text{etc.}) = \alpha' a_j + \text{etc.}$$

Thus we obtain a new set ($\alpha''' = \kappa\alpha''$, $\beta''' = \kappa\beta''$, etc), proportional to those ascertained, viz., $\alpha'''$; $\beta'''$, etc. When this has been done, then the aggregate expenditure based on the corrected units for the second period is identical with the aggregate expenditure based on the units for the original period, notwithstanding that the system of units has been altered. That is, for the year of change the aggregate expenditure is unaltered, but the distribution among the commodities has been changed.

9. **Price-Indexes when the Number of Commodities is greatly changed.**—We now pass to the consideration of the case where only some of the commodities are common to the two series, and the weights on the occasions compared are very different. In such a case we can continuously trace an exchange-value relation only through the $k$ commodities common to the two groups, and the only theoretically satisfactory comparison is one where the two periods are compared on an identical basis, viz., the arithmetic mean (or more strictly on the geometric mean) of the two series of units. In practical examples it is probable that it is never necessary to use the geometric mean, for in all practical cases the change of regimen from decennium to decennium can hardly be such as to involve very great differences of weights, or even to involve the alteration of a very large number of commodities. The determination of relations of $k$ commodities of different weights in the series of commodities for the two periods will not therefore be unsatisfactory. In fact, it may be said that in almost every practical example the two means (arithmetic and geometric) will give practically identical results.

The reason of this is that the two means rarely differ very much, as will be seen from the following table, the original unit being 1:—

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ($a$) Number of new units $N$ = | 1 | 2 | 3 | 4 | 5 | 9 | 10 | 19 |
| ($b$) Arithmetic mean .. | 1 | $1\frac{1}{2}$ | 2 | $2\frac{1}{2}$ | 3 | 5 | $5\frac{1}{2}$ | 10 |
| ($c$) Geometric mean .. | 1 | 1.41 | 1.73 | 2.0 | 2.24 | 3 | 3.16 | 4.36 |
| ($b$–$c$)/$c$ Percentage of difference divided by $N$ : | 0 | 3.03 | 5.16 | 6.25 | 6.83 | *7.41 | 7.39 | 6.81% |

* Maximum value.

From this table it is seen that if the new units be $N$ times the preceding units the arithmetic mean will exceed the geometric mean by never more than 7.4 $N$ per cent. of the latter. Consequently whatever mode we assume for the growth of the unit from one value to another we may take the arithmetic mean of the units in practical examples.

Reverting to formula preceding, and remembering that the sum in these cases is for the $k$ commodities only, it will still be true that the product of the bracketed quantities in (12) and (14) will be sensibly unity for contiguous decennial periods. In this instance a kind of general continuity can be established even though the regimen is changed (it may be) *per saltum* each decennium. We proceed to elaborate the question. Whenever the number of commodities has been changed the question of continuity can be tested in the following manner, viz. :—

Let $R$ denote the computed aggregate of expenditure on the commodities which appear in the old but not in the new list ; $S$ and $S'$ denote the aggregate of expenditures on the continued commodities, viz., those appearing in both the old and new lists ; $T'$ the aggregate of expenditure on those appearing in the new list only, and let as before the suffixes denote the year to which the expenditure refers. When the relative values of the units to be used for the new period (that is, for expenditure $S' + T'$) have been found, then these units must be so corrected, see formula (15), that the expenditure on the $k$ commodities whose aggregate is $S$ or

$S'$ shall be identical, whether calculated by the new or by the old units. Then we shall have $\kappa S' = S$, and $\kappa T' = T$, so that $S$ is identical with either series of units, and $T$ is calculated on the *corrected* relative units (the correction making of course no change in their ratio to one another). Then we have by an operation similar to formula (10),

$$(16) \ldots\ldots {}_0I_{j+g} = \frac{S_j + R_j}{S_0 + R_0} \quad \frac{S_{j+g} + T_{j+g}}{S_j + T_j} = \frac{S_{j+g}}{S_0} \cdot \left\{ \frac{1 + \frac{R_j}{S_j}}{1 + \frac{T_j}{S_j}} \right\} \cdot \left\{ \frac{1 + \frac{T_{j+g}}{S_{j+g}}}{1 + \frac{R_0}{S_0}} \right\}$$

Now, since $S_j / S_o$ is continuous under the old system of units, and $S_{j+g}/ S_o$ is continuous under the new system ; $S_{j+g} / S_o$ is at least what we have called pseudo-continuous through the entire period, this pseudo-continuity being attained by the correction of the units, so that the aggregate of expenditure on the $k$ commodities is identical with either system of units.

It can be seen from the above expression that if in introducing new commodities we take care that the aggregate expenditure on these, with corrected units, exactly equals the expenditure on those omitted at the year of change, we secure this, viz., that the left-hand term in brackets in formula (16) shall be unity, and further that the fractional terms on the right-hand term in brackets shall be of the same order and also in most cases sensibly equal. For this reason it is eminently desirable that the units be so determined that the whole aggregate of expenditure shall be identical with the new units as well as the aggregate for the commodities common to both groups. Then if the quantity in the right hand brackets is sensibly unity we can regard the pseudo-continuity as established. In practical examples $g$ should be one, that is the example should apply to the year immediately following that in which the change in the commodities and units is made.

Where it is desired to add a number of commodities such that the expenditure thereon is large as compared with expenditure on those omitted, we rewrite the terms in brackets in (16)

$$(16a) \ldots\ldots {}_0I_{j+g} = \frac{S_{j+g}}{S_0} \left\{ \frac{1 + \frac{R_j}{S_j}}{1 + \frac{R_0}{S_0}} \right\} \cdot \left\{ \frac{1 + \frac{T_{j+g}}{S_{j+g}}}{1 + \frac{T_j}{S_j}} \right\}$$

In this $R_j / S_j$ is a quantity which is ordinarily nearly equal to $R_0 / S_0$, and also $T_{j+g} / S_{j+g}$ is ordinarily comparable to $T_j / S_j$. When this condition happens to be satisfied the continuity may be satisfactory despite the fact that a relatively large addition of commodities has been made as compared with those omitted.

10. **Effect of Change of Regimen.**—When the product of the factors in (16) and (16$a$) is not unity, then they exhibit approximately the consequence of change of regimen.

In connection with a discussion on the variation of the exchange-value of gold the effect of change of regimen is to be carefully distinguished from mere variation in the magnitude of the units. It can best be illustrated thus :—

Suppose that, with the same list of commodities for any datum year, and using two series of units, we have *equal expenditures*, agreeably to the prescription of formula (15), and find with the prices for any other year a difference of expenditure, this difference measures the effect of change of regimen. To express this otherwise suppose that $I$ and $I'$ denote the price-index as deduced with an identical list of commodities but with two series of units, of which let us assume $I$ is on an original, and $I'$ on a new basis, the expenditures being identical for the datum year. Then we have for $\rho$ the effect of the change of regimen.

$$(17) \ldots\ldots \rho = I'/I.$$

Each year will, of course, give a different value for $\rho$, but if actual results shew that the variations of $\rho$ are very small, we can regard the (weighted) mean as furnishing a general measure of the effect of the change. As the distance in time increases from the datum year, the individual values obviously become of less weight. Hence we may empirically adopt some such formula as

$$(18) \ldots \rho_m = \frac{\Sigma \frac{\rho n}{n}}{\Sigma \frac{1}{n}} ; \text{ or } \frac{\Sigma \frac{\rho n}{n}}{1 + \frac{1}{2} + \frac{1}{3} + \ldots + \frac{1}{n}} = \frac{\Sigma \frac{\rho n}{n}}{0.577216 + 2.3025851 \log_{10} n + \frac{1}{2n} - \frac{1}{12n^2} + \frac{1}{120n^4}}$$

if we have the values of this factor for successive years 1, 2, 3 . . . . . . $n$. In general the variations of $\rho$ will exhibit variations shewing no definite tendency ; when this is not the case the progressive change may demand special investigation.

11. **Pseudo-Continuity of Price-Indexes with Progressive Change of Regimen.**— For comparative purposes stretching over long periods of time it would appear on the whole desirable to adopt a method, which would be sensibly accurate for short periods of time from the standpoint of the exchange-value of gold, and yet nevertheless represent for long periods the combined effect of change of regimen and altered exchange-value or purchasing-efficiency of gold, the change of regimen corresponding to variations in the international usage from period to period. Under such a system the ratio of price-indexes for distant dates would, strictly speaking, then cease to represent changes in the exchange-value of gold but rather those changes as modified by an alteration of the average regimen. Comparisons from the standpoint of variations in the exchange-value of gold alone would have to be dealt with by special investigations where necessary. We proceed now to consider the question.

The fundamental idea on which a pseudo-continuity can be developed is that for the years of change (constituting what we shall call the successive control years), the change of units shall be so controlled that the aggregate of expenditure on the $k$ commodities, common to the two groups, shall be identical with the two series of units (formula 15). This gets rid, in probably the most convenient way, of the difficulty that in general we cannot ascertain the *absolute*, but only the relative, number of units used of each commodity.

It will facilitate the explanation to describe the method schematically, and the method can best be illustrated as follows :—

| | Commodities disappearing. | Commodities constant to both periods. | Commodities being introduced. |
|---|---|---|---|
| 1900 | A B C———————— | D E F G H | I K L M |
| 1910 | A B C | D E F G H———————— | I K L M |

Let 1900 be the last year when commodities say A to H, are to be fully included. It is decided in 1910 to revise the list so that it shall contain commodities D to M, but not A to C. In this case 1901 is to be regarded as the change year. For this year we must see that the aggregate of expenditure on D to H is equal as required by formula (15) ; and must see also that, using the old units for A to C, the aggregate of expenditure is equal (approximately) to that on D to M working with the corrected units. When this has been done we decrease the units of A, B, C, yearly by one-tenth of the original amount, and increase those of I, K, L ,M, yearly one-tenth of their weight for 1900, according to the following scheme, viz. :—

| Units for Commodities. | Factor corresponding to year. | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1900 | 1901 | 1902 | . . . . . . . . . | 1908 | 1909 | 1910 |
| $\alpha, \beta, \gamma$* | $\frac{10}{10}$ | $\frac{9}{10}$ | $\frac{8}{10}$ | . . . . . . . . . . | $\frac{2}{10}$ | $\frac{1}{10}$ | $\frac{0}{10}$ |
| $\iota, \kappa, \lambda, \mu$† | $\frac{0}{10}$ | $\frac{1}{10}$ | $\frac{2}{10}$ | . . . . . . . . . . | $\frac{8}{10}$ | $\frac{9}{10}$ | $\frac{10}{10}$ |

* Units of commodities disappearing. † Units of commodities being introduced.

Thus in this scheme A, B, C, have entirely disappeared in 1910, and I, K, L, M, have appeared with their full values in the same year, while intermediately one series is increasing and the other is diminishing. We also change each of the units for the commodities D to H one-tenth of their difference yearly so that the new values are reached in 1910. That is, if $\delta'$ denote the corrected weight in 1910, and $\delta$ the weight in 1900, the weight for 1900 + $n$ years ($n$ being less than 10), will be

$$(19) \ldots\ldots\ldots \delta + \frac{n}{10}(\delta' - \delta) = \frac{10-n}{10}\,\delta + \frac{n}{10}\,\delta'.$$

A very simple numerical illustration will shew the effect of the process, and for this purpose we need take only two commodities which we may suppose to represent the continuous series. These will illustrate the nature of the difference of the two methods. Let us then suppose a regimen of commodities in the first years of a series to be in the ratio of 1 of A to 2 of B: and for the fifth year to be 2.7 of A to 2.4 of B.

We first find by formula (15), see hereinbefore, that with the prices as at the final or control year—

$$I = \frac{2}{3} \text{ viz., } \frac{1 @ 4 + 2 @ 8}{2.7 @ 4 + 2.4 @ 8} = \frac{20}{30}.$$

Hence the units become 1.8 and 1.6, that is—

$$1 @ 4 + 2 @ 8 = 1.8 @ 4 + 1.6 @ 8.$$

We thus obtain the results in the table hereunder, viz. :—

(i.) for the method of continuously depending upon the original number of units of $k$ commodities, and

(ii.) for the method of changing the units yearly, respectively—

| Computation with unchanged weights. | | | | | | Computation with changed weights. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year. | Units. A | Price of A | Units. B | Price of B | Aggregate. (i.) | Changing Units. A | Price. A | Changing Units. B | Price. B | Aggregate. (ii.) |
| 1 .. | 1 | 3 | 2 | 10 | 23 | 1.0 | 3 | 2.0 | 10 | 23 |
| 2 .. | 1 | 4 | 2 | 8 | 20 | 1.2 | 4 | 1.9 | 8 | 20 |
| 3 .. | 1 | $2\frac{1}{2}$ | 2 | 7 | 16 | 1.4 | $2\frac{1}{2}$ | 1.8 | 7 | 16.1 |
| 4 .. | 1 | 5 | 2 | 9 | 23 | 1.6 | 5 | 1.7 | 9 | 23.3 |
| 5 .. | 1 | 4 | 2 | 8 | 20 | 1.8 | 4 | 1.6 | 8 | 20 |

It is easy to see that the control which ensures the identity of the final aggregates (i.) and (ii.) for year 5, ensures also that the intermediate values for years 2, 3 and 4 shall substantially agree. Similarly, since for the change-year the expenditure on the commodities added is to balance that on those subtracted, we shall get a satisfactory continuity through that year, and thus results which shew the effect *mainly* of change of price, though modified slightly by change of regimen.

12. **Suggested List of Commodities and Scheme of Working.**—The following table shews the commodities included by various authorities in compiling Index-Numbers for different countries. In this tabular statement only commodities which are common to more than three of the 27 index-numbers have been included; commodities which are included in only one or in either two or three of the index-numbers are specified in the notes at the end of the table. Where any commodity is included in more than three of the index-numbers the fact is indicated by a cross (X); in every case where more than one grade or quality of any commodity is included the small number shewn in brackets after the cross specifies the number of grades or qualities.
Take in Table.

**Commodities included in**

| Commodity. | Great Britain. | | | | | | | Germany. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bishop Fleetwood, 1707. | Economist, 1845–1911. | Bourne, 1851–1879. | Palgrave, 1865–1886. | Jevons, 1792–1865. | Sauerbeck, 1846–1911. | Board of Trade, 1871–1911. | Laspeyres, (Hamburg) 1831–1863. | Paasche (Hamburg), 1847–1872. | V'nderB'rght (Hamburg), 1847–1880. | Conrad (Hamburg), 1871–1898. | Soetbeer (Hamburg), 1847–1891. |
| No. of Commodities | 39 | 22 | 20 | 22 | 39 | 39 | 45 | 48 | 47 | 22 | 47 | 114 |
| **Metals and Coal.** | | | | | | | | | | | | |
| Coal .. .. | .. | .. | X | .. | .. | X(2) | X | X | X | X | X | X |
| Copper .. .. | .. | X | X | X | X | X(2) | X | X | X | X | X | X |
| Iron .. .. | .. | X | X | X | X(2) | X(2) | X | X | X(2) | X | X(2) | X(3) |
| Lead .. .. | .. | X | X | X | X | X | X | X | X | X | X | X |
| Silver .. .. | .. | .. | .. | .. | X | .. | .. | .. | .. | .. | .. | .. |
| Tin .. .. | .. | X | X | X | X | X | X | X | X | X | X | X |
| Zinc .. .. | .. | .. | .. | .. | .. | .. | X | X | X | X | X | X |
| **Textiles, etc.** | | | | | | | | | | | | |
| Hides .. .. | X | .. | .. | .. | X | X(2) | X | X | .. | .. | .. | X |
| Leather .. | .. | X | X | X | X | X | .. | X | .. | .. | .. | X |
| Tallow .. .. | .. | X | X | X | X | X(2) | .. | .. | X | .. | X | X |
| Cotton, Raw .. | .. | X(2) | X | X(2) | X(3) | X(2) | X | X | X | X | X | X |
| ,, Cloth .. | .. | X | .. | X | .. | .. | .. | .. | .. | .. | .. | X(3) |
| ,, Yarn .. | .. | X | .. | X | .. | .. | .. | .. | X | .. | X | X |
| Flax .. .. | X | X | X | X | X | X(2) | X | X | X | .. | X | X |
| Hemp .. .. | .. | X | X | X | X | X(2) | .. | X | X | .. | X | X |
| Jute .. .. | .. | .. | .. | .. | .. | X | X | .. | .. | .. | .. | .. |
| Linen .. .. | .. | .. | .. | .. | .. | .. | .. | .. | X | .. | X | X(2) |
| Silk, Raw .. | .. | X | X | X | X | X | X | .. | X | X | X | X |
| Wool .. .. | X | X | X | X | X | X(3) | X(2) | X | .. | .. | X | X |
| Woollen Yarn .. | .. | .. | .. | .. | .. | .. | .. | .. | X | .. | .. | X(2) |
| **Agricultural Produce** | | | | | | | | | | | | |
| Barley .. .. | X | .. | .. | .. | X | X | X(2) | X | X | X | X | X |
| Beans .. .. | X | .. | .. | .. | X | .. | .. | .. | .. | .. | .. | X |
| Clover .. .. | .. | .. | .. | .. | X | .. | .. | X | X | .. | X | X |
| Hay .. .. | X | .. | .. | .. | X | .. | .. | .. | .. | .. | .. | .. |
| Linseed .. | .. | .. | .. | .. | .. | X | X | .. | .. | .. | .. | .. |
| Maize .. .. | .. | .. | .. | .. | .. | X | X | .. | .. | .. | .. | .. |
| Oats .. .. | X | .. | .. | .. | X | X | X(2) | X | X | X | X | X |
| Peas .. .. | X | .. | .. | .. | X | .. | .. | .. | .. | .. | .. | X |
| Rape Seed .. | .. | .. | .. | .. | .. | .. | .. | X | X | .. | X | X |
| Rice .. .. | .. | .. | .. | .. | .. | X | X | X | X | X | X | X |
| Rye .. .. | X | .. | .. | .. | X | .. | .. | X | X | X | X | X |
| Straw .. .. | .. | .. | .. | .. | X | .. | .. | .. | .. | .. | .. | .. |
| Wheat .. .. | X | X | X | X | X | X(2) | X(2) | X | X | X | X | X |
| **Dairy Produce.** | | | | | | | | | | | | |
| Bacon .. .. | .. | .. | .. | .. | .. | X | X | .. | .. | .. | .. | .. |
| Butter .. .. | .. | .. | .. | .. | X | X | .. | X | X | .. | X | X |
| Cheese .. .. | X | .. | .. | .. | .. | .. | .. | X | .. | .. | .. | X |
| Eggs .. .. | X | .. | .. | .. | .. | .. | X | .. | .. | .. | .. | X |
| Milk .. .. | X | .. | .. | .. | .. | .. | X | .. | .. | .. | .. | X |
| **Groceries, etc.** | | | | | | | | | | | | |
| Almonds .. | X | .. | .. | .. | .. | .. | .. | X | X | .. | X | X |
| Cocoa .. .. | .. | .. | .. | .. | .. | .. | X | X | X | X | X | X |
| Coffee .. .. | .. | X | X | X | .. | X(2) | X | X(3) | X | X | X | X |
| Currants .. | .. | .. | .. | .. | .. | .. | .. | X | X | .. | X | X |
| Flour .. .. | .. | .. | .. | .. | .. | X | .. | X | .. | .. | .. | X |
| Hops .. .. | .. | .. | .. | .. | .. | .. | X | .. | X | .. | .. | X |
| Lard .. .. | .. | .. | .. | .. | .. | .. | .. | .. | X | .. | X | X |
| Malt .. .. | X | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | X |
| Pepper .. .. | .. | .. | .. | .. | X | .. | .. | X | X | X | X | X |
| Potatoes .. | .. | .. | .. | .. | .. | X | .. | .. | .. | .. | .. | X |
| Raisins .. .. | X | .. | .. | .. | .. | .. | .. | X | X | .. | X | X |
| Rye Flour .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | X |
| Salt .. .. | X | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | X |
| Spirits .. .. | .. | .. | .. | .. | X | .. | X | X(2) | .. | .. | .. | X(3) |
| Sugar .. .. | .. | X | X | X | X | X(3) | X | X(2) | X | X | X | X(2) |
| Tea .. .. | .. | X | X | X | X | X(2) | X | X | X | X | X | X |
| Tobacco .. | .. | X | X | X | .. | .. | X | X | .. | .. | .. | X |
| **Meat, Etc.** | | | | | | | | | | | | |
| Beef .. .. | .. | X | X | X | X | X(2) | X | X | .. | .. | .. | X |
| Mutton .. .. | .. | .. | .. | .. | X | X(2) | X | .. | .. | .. | .. | X |
| Pork .. .. | .. | .. | .. | .. | X | X | .. | X | .. | .. | .. | X |
| Sheep .. .. | X | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Fish .. .. | X | .. | .. | .. | .. | .. | X | X | X | .. | X | X(2) |
| **Building Materials.** | | | | | | | | | | | | |
| Bricks .. .. | .. | .. | .. | .. | .. | .. | X | .. | .. | .. | .. | .. |
| Timber .. .. | .. | X | X | X | X | X(2) | X | .. | .. | .. | .. | .. |
| **Miscellaneous.** | | | | | | | | | | | | |
| Caoutchouc .. | .. | .. | .. | .. | .. | .. | X | .. | .. | .. | .. | X |
| Indigo .. .. | .. | X | X | X | X | X | .. | X | X | X | X | X |
| Oils .. .. | .. | X | X | X | X(2) | X(3) | X(2) | X | X(4) | X(2) | X(5) | X(5) |
| Saltpetre .. | .. | .. | .. | .. | .. | .. | .. | X | X | X | X | X |
| Soda .. .. | .. | .. | .. | .. | .. | X | .. | X | .. | .. | .. | X |

Commodities not common to more than three of the above index-numbers have been excluded from the computation of each index-number, but not shewn

**various Investigations.**

| | Germany. | | | A'stria Hun-gary. | France. | | | Italy. | Switz-erland. | India. | U.S. of America. | | C'nada | Australia. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Prussia Government, 1840–1891. | German Em. Government, 1879–1911. | Hooker, 1890–1910. | Government, 1830–1890. | Palgrave, 1865–1884. | Falkner, 1861–1910. | Hooker, 1890–1910. | Government, 1862-85 | Walras, 1871–1884. | Atkinson, 1871–1895. | Aldrich, 1840–1891. | Bureau of Labour, 1890–1911. | Coats, 1890–1911. | Wholesale, 1871–1912. | Retail, 1901–1912. |
| | 17 | 37 | 40 | 9 | 22 | 38 | 40 | 6 | 20 | 45 | 223 | 257 | 230 | 80 | 46 |
| | .. | X | X(2) | .. | X | X | X(2) | .. | .. | X | X(8) | X(7) | X(3) | X | .. |
| | .. | X | X | .. | X | X | X | .. | .. | .. | X(2) | X | X | X | .. |
| | .. | .. | X(2) | .. | X | X | X(2) | .. | .. | .. | X(4) | X(4) | X | X(7) | .. |
| | .. | .. | X | .. | X | X | X | .. | .. | .. | X(2) | X | X | X(2) | .. |
| | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | X | X | .. | .. |
| | .. | X | X | .. | .. | .. | X | .. | .. | .. | .. | X | X | .. | .. |
| | .. | .. | .. | .. | X | X | .. | .. | .. | .. | X | X(2) | X | X | .. |
| | .. | .. | X(2) | .. | X | X(2) | X(2) | .. | .. | X | X | X | X | .. | .. |
| | .. | .. | .. | .. | .. | .. | .. | .. | .. | X | X(2) | X | X | X(3) | .. |
| | .. | .. | .. | .. | X | .. | X | .. | .. | X | .. | X | X | .. | .. |
| | X | X | X | .. | X | X | X | .. | .. | X | .. | X | X | X | .. |
| | .. | .. | .. | .. | .. | X | .. | .. | .. | X | X(3) | X | X | .. | .. |
| | .. | .. | X | .. | .. | X | X | .. | .. | .. | .. | .. | .. | .. | .. |
| | .. | .. | X | .. | .. | .. | X | .. | .. | .. | .. | X | .. | .. | .. |
| | .. | .. | X | .. | .. | .. | X | .. | .. | .. | .. | .. | .. | .. | .. |
| | .. | .. | X | .. | .. | .. | X | .. | .. | X | .. | X | X | .. | .. |
| | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | X | X | .. | .. |
| | .. | .. | X | .. | X | X(3) | X | .. | .. | X | .. | X | X | X | .. |
| | .. | .. | X(2) | .. | X | X | X(2) | .. | .. | X | X(2) | X | X | X | .. |
| | .. | .. | .. | .. | X | X | .. | .. | .. | .. | .. | X | X | .. | .. |
| | X | X | X | X | .. | .. | X | .. | X | .. | .. | X | X | X(2) | .. |
| | X | .. | .. | .. | .. | .. | .. | .. | .. | .. | X | .. | .. | .. | .. |
| | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| | X | .. | .. | X | .. | .. | .. | .. | X | .. | .. | X | X | X | .. |
| | .. | .. | .. | .. | .. | X | .. | .. | .. | X | .. | .. | .. | .. | .. |
| | .. | .. | X | X | .. | .. | X | X | .. | X | .. | .. | X | X | .. |
| | X | X | X | X | .. | .. | X | .. | X | .. | .. | X | X | X | .. |
| | X | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | X | X | .. |
| | .. | .. | .. | .. | .. | .. | .. | .. | .. | X | .. | .. | .. | .. | .. |
| | .. | X | X | .. | X | X | X | X | .. | X | X | X | X | X | X |
| | X | .. | X | X | .. | .. | X | .. | X | .. | .. | X | X | .. | .. |
| | X | .. | .. | X | .. | .. | .. | .. | X | .. | .. | X | X | X | .. |
| | X | X | X | X | X | X | X(2) | X | X(2) | X | .. | X | X | X | .. |
| | X | .. | .. | .. | .. | .. | .. | .. | X | .. | X | X | X | X | X(2) |
| | X | .. | X | .. | X | X | X | .. | X | X | X | X | X | X | X |
| | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | X | X | X | X | X(2) |
| | .. | .. | .. | .. | .. | .. | .. | .. | X | .. | X | X | X | X | X(2) |
| | X | .. | .. | .. | .. | .. | .. | .. | .. | .. | X | X | X | .. | X |
| | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| | .. | .. | .. | .. | .. | .. | X | .. | .. | .. | .. | .. | .. | X | .. |
| | .. | X | X | .. | X | X | X | .. | .. | X | X | X | X | X | .. |
| | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | X | X | X | X | X |
| | .. | X | .. | .. | .. | .. | X | .. | .. | .. | X | X | X | X | X |
| | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | X | .. | X | .. |
| | .. | .. | X | .. | .. | .. | .. | .. | X | .. | X(2) | X | X | X | .. |
| | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | X | X | .. | .. |
| | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | X | X | X | .. | .. |
| | X | X | X | X | .. | .. | .. | .. | X(2) | X | X(2) | X | X | X | X |
| | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | X | X | X | X | X |
| | .. | .. | X | .. | .. | .. | .. | .. | .. | .. | X | X | .. | .. | .. |
| | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | X(5) | X | X | X | .. |
| | .. | .. | X | .. | .. | .. | X | .. | .. | .. | X | X | X(3) | X(2) | .. |
| | X(2) | .. | X | .. | X | X | X | .. | .. | X | X(4) | X | X | X | X |
| | .. | .. | .. | .. | .. | .. | .. | .. | .. | X | .. | X | X | X | X |
| | .. | .. | X | .. | X | X | .. | .. | .. | X | .. | X | X | X | .. |
| | X | .. | .. | X | X | .. | .. | X | X | X | X(3) | X | X(2) | X | X(11) |
| | X | .. | .. | .. | .. | .. | .. | .. | X | X | X | X | X | X | X(7) |
| | X | .. | .. | .. | .. | .. | .. | .. | .. | .. | X | X | X | X | X(4) |
| | .. | .. | X | .. | .. | X | X | .. | .. | .. | .. | X | X | .. | .. |
| | .. | X | X | .. | .. | .. | .. | .. | .. | .. | X(4) | X(4) | X(9) | X(3) | .. |
| | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | X | X | X | .. | .. |
| | .. | .. | .. | .. | .. | .. | .. | .. | .. | X | X(17) | X(10) | X | X(7) | .. |
| | .. | .. | .. | .. | .. | .. | .. | .. | .. | X | X | X | X | .. | .. |
| | .. | .. | .. | .. | .. | .. | .. | .. | .. | X | .. | .. | .. | .. | .. |
| | X | .. | X | .. | X | X | X(2) | X | .. | X | X | X | X | X | X |
| | .. | .. | .. | .. | .. | .. | .. | .. | .. | X | .. | .. | .. | X | .. |
| | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |

the above tabular statement. The notes hereunder shew the balance of the commodities included in in the above table for the reason above assigned.

In the following notes particulars are given regarding commodities included in each of the above index-numbers, but excluded from the preceding table for the reason already stated.

*Fleetwood.*—Cloth, Shoes, Ploughs, Carts, Land, Horses, Cattle, Mules, Swine, Goats, Fowls, Rabbits, Pigeons, Wine, Ale, Beer, Spice, Wax, Figs, Charcoal.

*Jevons.*—Tin Plates, Logwood.

*Sauerbeck.*—Petroleum, Nitrate of Soda.

*Board of Trade.*—Wine, Cotton Seed, Paraffin, Petroleum.

*Laspeyres.*—Logwood, Calfskin, Rags, Tar, Wine.

*Paasche.*—Mahogany, Calfskins, Bristles, Horse-hair, Wax, Quicksilver.

*Conrad.*—Mahogany, Hops, Calfskins, Bristles, Horse-hair, Wax, Quicksilver.

*Soetbeer.*—Buckwheat, Oilcake, Veal, Calfskins, Horse-hair, Bristles, Bed-feathers, Bones, Buffalo Horns, Glue, Dried Prunes, Wine, Champagne, Allspice, Cassia Bark, Sago, Cochineal, Logwood, Rosewood, Mahogany, Rattan, Ivory, Quicksilver, Sulphur, Lime, Cement, Cordage, Rags, Guano, Gum-elastic, Resin, Pearl Ash, Pitch, Potash, Candles, Tar, Wax, Sewing Thread, Bottles, Sailcloth, Woollen Cloth, Flannels, Worsted, Carpets.

*Prussian Government.*—Lentils, Veal. 37 articles are given but only 15 are specified.

*Hooker* (Germany).—Cattle, Calves, Pigs (2), Hops, Petroleum.

*Palgrave* (France).—Oil-seed, Silk Stuffs, Gloves.

*Falkner* (France).—Beeves, Calves, Cows, Hogs, Sesamum, Lambskins, Kid-skins, Silk Goods (2), Merinos, Blankets, Carpets, Tapestry, Gloves.

*Hooker* (France).—Cattle, Calves, Pigs, Wine, Nitrate of Soda.

*Italy* (Government).—Wine.

*Walras* (Switzerland).—Bread (2), Veal, Firewood (2).

*Atkinson* (India).—Mace, Millet Corn, Pulse, Fajra, other Grains, Ginger, Opium, Croton, Castor Oil, Dye, Bone Manure, Jute Goods, Silk Goods, Shellac.

*Aldrich* (U.S.A.).—Ship Bread (3), Boston Crackers (2), Oyster Crackers, Ship Biscuits, Soda Crackers, Dried Apples, Corn Meal, Ham, Lamb, Molasses (2), Nutmegs, Cornstarch (2), Blankets (2), Broadcloths (2), Calico, Carpets (3), Cassimeres (4), Checks, Horse Blankets, Print Cloths (2), Shawls, Sheetings, Shirtings, Ticking, Candles, Matches, Anvils, Butts, Door Knobs, Lead Shot, Locks (2), Meat Cutters, Cut Nails, Pocket Knives (25), Quicksilver, Rope (3), Saws (4), Scythes, Shovels, Wood Screws, Carbonate of Lead, Cement, Doors, Lime, Oxide of Zinc, Plate Glass (6), Putty, Tar, Turpentine, Window Glass, Alum, Potash, Vitriol, Brimstone, Calomel, Copperas, Flax Seed, Glycerine, Mercury, Muriatic Acid, Opium, Quinine, Soda Ash, Sugar of Lead (2), Sulphuric Acid, Furniture (3), Glass-ware (5), Pails (3), Tubs (4), Powder (2), Soap, Starch.

*Bureau of Labor* (U.S.A.).—Canned Corn, Canned Peas, Canned Tomatoes, Dried Apples, Prunes, Glucose, Corn Meal (2), Molasses, Fresh Vegetables, Onions, Broadcloth, Drill, Gingham, Horse Blankets, Hosiery, Overcoatings, Sheetings, Shirtings, Tickings, Underwear, Sicilian Cloth, Cashmere, Poplar, Panama, Worsted and Worsted Yarn, Candles, Matches, Augers, Axes, Barb Wire, Butts, Chisels, Copper Wire, Steel Door Knobs, Files, Hammers, Lead Pipe, Locks, Cut Nails, Wire Nails, Planes, Saws (2), Shovels, Steel Billets, Steel Rails, Steel Sheets, Trowels, Vises, Wood Screws, White Lead, Cement (2), Doors, Lime, Oxide of Zinc, Plate Glass, Putty, Resin, Shingles, Turpentine, Window Glass, Alum, Brimstone, Glycerine, Muriatic Acid, Opium, Quinine, Sulphuric Acid, Earthenware Plates, Cups and Saucers, Bed Sets, Chairs (2), Tables, Glassware (3), Cutlery, Woodenware, Cotton Seed, Meal, Newspaper, Wrapping Paper, Rope, Soap, Cattle, Fowls, Horses, Mules, Swine, Bread, Blankets, Carpets, Shoes and Boots (4), Quicksilver.

*Coats* (Canada).—Bran, Shorts, Turkeys, Chocolate, Cream of Tartar, Fresh Fruit (6), Honey, Maple Sugar, Oatmeal, Molasses, Tapioca, Vegetables (3), Canned Vegetables (3), Vinegar, Brass, Solder, Anvils, Axes, Grindstones, Hammers, Horseshoes, Mallets, Picks, Screws, Soldering Irons, Vices, Coke, Carbide of Calcium, Matches, Hinges, Wire Nails, Cut Nails, Plaster of Paris, Sash Weights, Soil Pipe, Wire Cloth, Wire Fencing, Paints, Glass, Benzine, Glue, Boiled Oil, Putty, Paris Green, Shellac, Turpentine, Varnish, White Lead, Chairs, Tables, Sideboards, Bed Suites, Beds, Tumblers, Cups and Saucers, Toilet Sets, Dinner Sets, Knives, E.P. Knives and Forks, Wood Pails, Wood Tubs, Brooms, Alum, Bleaching Powder, Borax, Carbolic Acid, Caustic Soda, Copperas, Glycerine, Muriatic Acid, Opium, Quinine, Soda Ash, Sulphuric Acid, Furs (4), Binder Twine, Rope, Soap, Cattle, Beer, Shoes and Boots (3).

*Australia* (Wholesale).—Branbags, Cornsacks, Woolpacks, Leather (3), Bran, Pollard, Oatmeal, Ham, Honey, Macaroni, Sago, Mustard, Starch, Blue, Matches, Candles, Kerosene, Veal, Lamb, Cement, White Lead, Cream of Tartar, Sulphur.

*Australia* (Retail).—Bread, Sago, Jam, Oatmeal, Starch, Blue, Candles, Soap, Onions, Ham.

In addition to the authorities mentioned in the above table, investigations have also been made in the following countries, but details as to the commodities included therein are not available :—

| Country. | Name of Authority. | Years. | No. of Articles. |
|---|---|---|---|
| *Great Britain*— | *Rice Vaughan* | 1675 | |
| | *Evelyn* | 1798 | |
| | *Mulhall* | 1854–1884 | 50 |
| *Germany* (Hamburg)— | *Kral* | 1845–1884 | 265 |
| | *Heinz* | 1850–1891 | 180 |
| | *Schmitz* | 1890–1910 | 29 |
| *France*— | *D'Avenal* | 1200–1898 | |
| | *De Foville* | 1847–1880 | |
| | *Réforme Economique* | | |
| *Belgium*— | *Waxweiler* | 1890–1910 | |
| *U.S. A*— | *Burchard* | 1825–1884 | 68 to 90 articles |
| | *Falkner* | 1890–1899 | 90 articles |
| *New Zealand*— | *McIlwraith* | 1861–1910 | 33 to 45 articles |

An examination of the above statement clearly shews the great diversity in practice which existed in the selection of commodities in order to obtain the price data for the computation of Index-numbers. It may be seen that not one of the 67 commodities specified is common to all the Index-numbers. Several commodities in ordinary use, such as coal, iron, cotton, wool, wheat, butter, etc., etc., are, however, common to the majority of the groups.

Applying the principles which have already been laid down in this Appendix for the selection of a group of commodities for the purpose of international comparisons the following list has been compiled. Suggested " mass-units " (indicating relative consumption of each commodity in the corresponding unit of measurement) are also shewn in the following statement. These " mass-units " are based almost entirely on the Australian consumption, and are therefore suggested tentatively ; they will probably require some amendment for international purposes.

## Proposed List of Commodities Suitable for Comparative Index-Numbers for the Western Nations with Mass Units.

| Commodities. | Unit of Measurement. | Mass-unit. |
|---|---|---|
| GROUP I. METALS AND COAL. | | |
| Copper .. .. | ton | 1 |
| Iron, Pig .. | ton | 28 |
| Lead, Pig .. | ton | 1 |
| Silver, Bars .. | oz. | 20,000 |
| Tin, Block .. | ton | $\frac{1}{4}$ |
| Zinc .. .. | ton | 1 |
| Coal .. .. | ton | 600 |
| GROUP II. TEXTILES, LEATHER, ETC. | | |
| Hides .. .. | each | 120 |
| Sheep Skins .. | each | 400 |
| Cotton, Raw .. | lb. | 24,000 |
| Flax .. .. | cwt. | 18 |
| Hemp .. .. | cwt. | 18 |
| Jute .. .. | cwt. | 40 |
| Silk .. .. | lb. | 250 |
| Wool .. .. | lb. | 12,200 |
| GROUP III. AGRICULTURAL PRODUCE. | | |
| Barley .. .. | bushel | 250 |
| Beans .. .. | bushel | 50 |
| Hay .. .. | ton | 270 |
| Maize .. .. | bushel | 1,000 |
| Oats .. .. | bushel | 1,300 |
| Peas .. .. | bushel | 55 |
| Rice .. .. | ton | 2 |
| Rye .. .. | bushel | 100 |
| Straw .. .. | ton | 25 |
| Wheat .. .. | bushel | 500 |
| Potatoes .. .. | ton | 40 |
| GROUP IV. DAIRY PRODUCE | | |
| Bacon .. .. | lb. | 3,200 |
| Butter .. .. | lb. | 9,500 |
| Cheese .. .. | lb. | 1,500 |
| Eggs .. .. | doz. | 1,800 |
| Milk .. .. | quart | 30,000 |
| Honey .. .. | lb. | 600 |
| GROUP V. GROCERIES, ETC. | | |
| Cocoa Beans .. | lb. | 100 |
| Coffee Beans .. | lb. | 200 |
| Currants .. | lb. | 1,400 |
| Flour (Wheat) .. | ton | 48 |
| Flour (Rye) .. | ton | 10 |
| Hops .. .. | lb. | 120 |
| Malt .. .. | cwt. | 10 |
| Pepper .. .. | lb. | 80 |
| Raisins .. .. | lb. | 1,400 |
| Sago .. .. | lb. | 800 |
| Salt .. .. | ton | 8 |
| Sugar .. .. | ton | 22 |
| Tea .. .. | lb. | 3,000 |
| Tobacco .. .. | lb. | 1,300 |
| Candles .. .. | lb. | 1,600 |
| Mustard .. .. | lb. | 72 |
| Kerosene .. .. | gallon | 1,700 |
| GROUP VI MEAT, ETC. | | |
| Beef .. .. | lb. | 39,000 |
| Veal .. .. | lb. | 2,000 |
| Mutton .. .. | lb. | 33,000 |
| Pork .. .. | lb. | 3,700 |
| Fish .. .. | lb. | 2,400 |
| Lard .. .. | lb. | 200 |
| Tallow .. .. | cwt. | 35 |
| GROUP VII. BUILDING MATERIALS | | |
| Bricks .. .. | per 1,000 | 50 |
| Timber .. .. | 100 s. ft. | 350 |
| Cement .. .. | cask | 30 |
| Lime .. .. | ton | 10 |
| Slates .. .. | per 1,000 | $\frac{1}{2}$ |
| GROUP VIII. MISCELLANEOUS. | | |
| Caoutchouc (Raw Rubber) .. | cwt. | 50 |
| Soda Carbonate | ton | $\frac{1}{2}$ |
| Saltpetre .. | ton | $\frac{1}{20}$ |
| Sulphur .. | ton | $\frac{1}{4}$ |
| Cream of Tartar | lb. | 400 |

**Summary of Conclusions.**—The conclusion of the whole matter divides itself into two heads, viz., (i.) that which concerns the list of commodities, the number of units to be taken, and changes in this list ; and (ii). that which concerns the technique of computing the price-index.

Regarding the first we may say as follows, viz. :—

I. (i.) The list should contain (*a*) commodities easily identifiable as to character and quality ; (*b*) commodities for which there are world markets. Commodities for which only a local market exists should constitute a separate list for local purposes.

(ii.) The number of units taken should represent the average usage among all the nations included in the comparison.

(iii.) The number of commodities and the units assigned should be subject to decennial revision.

(iv.) During each decennium, the series of units and commodities used must necessarily be those ascertained for the preceding decennium.

(v.) At the close of each decennium it is desirable that the price-indexes found for it should be revised on the introduction of the next decennial list of commodities, and the units of usage assigned to them.

(vi.) In order that the price-indexes, while substantially accurate from the standpoint of gold exchange-value, shall yet represent the actual usage of mankind in respect to commodities, its basis, owing to change of normal regimen, should be subject to continuous modifications.

(vii.) This is practically secured by varying the regimen units of commodities yearly one-tenth of the decennial difference, the *control* of the number of units assigned being properly attended to.

(viii.) Subdivisions of the list of commodities should be so made that the items within a subdivision are homogeneous with respect to the ratio of the value of the raw material to the value of the labour in the finished product.

(ix.) There can be no really perfect continuity between the price-indexes for periods characterised by different regimens.

(x.) Since economic inquiries of an exact character must take account of variations in the relative usage of commodities, comparisons between widely different periods must take account not only of variations in the exchange-value of gold, but also in average regimen.

In regard to technique, the common-sense method of adopting, for the purposes of comparison, a series of units of definite commodities and finding the aggregate of expenditure according to these, is unquestionably the best method of tracing the variations in the exchange-value of gold against commodities. The matter may be summed up as follows :—

II. (i.) For initial comparisons, the experience of each decennium will furnish the units that are used for the following decenniums.

(ii.) The method of finding the ratio of aggregate expenditures is not only the simplest but the best.

(iii.) Price-ratios are not satisfactory unless the weighted geometric mean be found, and using for the weights assigned the mean expenditure for any two periods. The method then becomes sensibly identical with the aggregate expenditure method, but the arithmetical work involved is prohibitive, and the method is not suited for continuous records.

(iv.) Although the apparent generality of the price-ratio method is not wholly an illusion, it practically has no advantages whatever over the aggregate of expenditure method, the latter being arithmetically very simple.

(v.) With the aggregate of expenditure method, the influence of any uncertainty in the series of commodities or in their prices, on the price-index deduced, can more readily be seen than with the price-ratio method.

(vi.) The establishment of an international series of commodities would have for its immediate object the comparison of the exchange-value of the gold-unit in each nation on the basis of a common average regimen.

(vii.) This may not be the best system of units for the nation itself.

(viii.) Each nation may find it necessary, therefore, to have also its own list, and its own units, and to deduce price-indexes representing the variation of the exchange-value of gold so far as the nation itself is concerned in its internal relations.

(ix.) In general the fluctuations on the two bases will not be quite identical, the difference being due to what may be called change of regimen.

(x.) Experience may, however, shew that the relation between the two can be readily determined, or is a negligible quantity, so that ultimately one list may suffice.

Regarding general matters the following may be said :—

III. (i.) It may, on first consideration, appear *unsatisfactory* that through long intervals of time the same class of commodities cannot be utilised for determining absolutely variations in the exchange-value of gold. If, however, the method involving slow variations of regimen be followed, there is no strong objection to the method indicated in this paper.

(ii.) *Per contra*, it is to be *preferred*, since it applies to the existing regimen at all points of time, at least when corrected as indicated by continuously varying the regimen.

(iii.) By these methods a satisfactory kind of *continuity can be secured*, which although only a pseudo-continuity as regards the exchange-value of gold, is nevertheless a real continuity as regards the usage of gold in relation to all other commodities on the list.

(iv.) It is therefore of much greater value than would be furnished by price-indexes based, if it were possible—which it is not—on a continued use of the commodities of the past as the basis of determination.

(v.) The method of a slowly changing "commodity unit," though establishing theoretically only approximate values, nevertheless yields results which more truly represent the aggregate of the facts, than does the method of absolute comparisons based upon the same number of units and the same list of commodities.

(vi.) Special investigations may nevertheless be considered necessary between any two years for any definite series of commodities, and any definite number of units in connection therewith.